THE AUTOMOBILE

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PRACTICAL TEST OF HUB-MOTOR TRUCK.

CLIMBING Lexington Avenue hill, between 102nd and 103rd streets, New York, is a genuine test for a motor vehicle under any conditions; but making the ascent with a load of more than four tons (8,700 pounds, to be precise), and the electric truck illustrated herewith, went up the grade last Saturday. The hill starts in abruptly at 102nd street with a grade of 15 per cent., and increases to 16 per cent., which gradient is held through the greater length of the block. Right at the top there is a short pitch of 18 per cent., and the hill terminates more abruptly than it began.

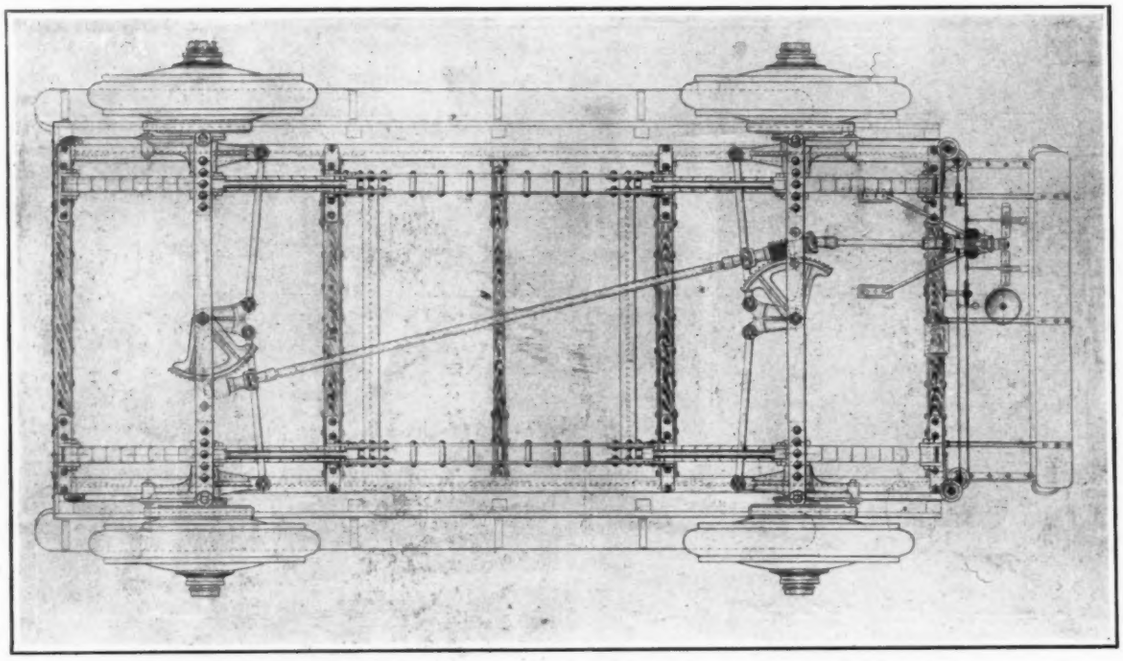
FOUR-WHEEL-DRIVE TRUCK CLIMBING NEW YORK'S STEEPEST HILL WITH FOUR-TON LOAD IN A HEAVY SNOWSTORM.

stopping and re-starting midway up the hill, during a snowstorm that had spread patches of snow on the stone block paving, is a feat few drivers would care to set their vehicles to attempt. Under such conditions

The Holson electric truck, which made this demonstration, is peculiar in several respects. It drives through all four wheels, and steers with front and rear wheels at the same time. There is a 2-horsepower motor in each wheel, and enclosed with it is the necessary transmission and reduction gearing. As a consequence of the equal distribution of the driving power the wheels are enabled to obtain a traction under the most unfavorable conditions, notwithstanding the solid rubber tires have a smooth tread. This was illustrated by bringing the two front wheels of the truck against a

curbing eight inches high and causing them to climb slowly to the top, without jerk or jar. On coming down, the motion was arrested, without using the brake, when the tires were within two or three inches of the road surface. After remaining stationary for a moment in this position, the four-ton truck was again made to mount the curb. This was repeated several times before the wheels were let down onto the paving again, and there was no sign of slipping at either front or rear wheels.

The manner in which this vehicle is maneuvered in congested traffic is likely to make the spectator, accustomed to the conventional methods of steering, stop to look again. Ordinarily the rear wheels turn in the opposite direction to the front wheels and at the same angle, so that they follow exactly in the tracks of the front wheels, as shown in one of the small engravings. With the wheels deflected to the limit, a circle about twenty-five feet in diameter can be cut, the wheels following so accurately that but a single pair of tracks can be seen. When occasion offers, however, the steering connections can be so changed by a device worked from the driver's seat, that all four wheels will turn in the same direction and angle, and the truck will execute an oblique movement. Again, the rear wheels can be locked so they do not turn, when the machine will steer like any front steering automobile.



PLAN OF RUNNING GEAR SHOWING FRONT AND REAR WHEEL STEERING CONNECTIONS.

Remarkable Economy of Power.

The assertions of the owners of the patents that the peculiar system of driving, transmission and steering is economical of power seem borne out by observations made by a representative of The Automobile, who made a trip with the truck last Saturday, and noted the current consumption as indicated by a Weston ammeter, newly calibrated and sealed. The truck was first tested light, and afterwards with load. Snow fell continuously during the trials, and the road surface for the tests under load was considerably more slippery than during the light tests. This, however, did not seem to have any effect on the working of the vehicle. Empty, the truck started on level road on 15-18 amperes; under load of 8,700 pounds it started on 20-25 amperes. Owing to the difficulty of judging whether the road was actually level, the figures given are probably rather high, but are the result of repeated tests, all on rough, snow-covered streets. When running on level road, light, the meter showed an average of 30 amperes, while with load the average was 45 amperes. Running light up Lexington Avenue hill, the reading was 95 amperes. After stopping on the hill, the truck started light on 120 amperes. Climbing the Lexington Avenue hill with load, the average current consumption was 115 amperes, voltage 78. This increased at the steep pitch near the top to nearly 125 amperes, and on the first part of the hill was about 100 amperes. The truck was stopped midway up the hill and held, without applying the brakes, on 40 amperes. It was then started up the hill on 150 amperes, which dropped to 115 amperes as soon as the truck got under way.

Slight Slippage in Snow.

A few days after this test, an opportunity was afforded to observe the operation of the truck in heavy, slushy snow. The current consumption fluctuated, naturally with the depth of the snow, which varied greatly,, being piled a foot deep in some places where it had been shoveled from the sidewalks, while in other spots the pavement was merely coated with a thin layer of slush. When all four wheels were running under similar conditions no slip was noticeable, even in wet snow fully a foot deep, and even when stopped in the middle of deep snow and started, there was no slip. Slipping seemed to occur only when one wheel ran on a spot giving much less traction than the other three wheels were obtaining. When this occurred that wheel would slip somewhat, though not much. No variation in the speed was noticed, even when two wheels slipped at the same time, the other wheels seeming to take up the work and keep the machine moving at the same rate of speed.

When making turns in the snow, the advantage of having the rear wheels follow in the tracks of the front pair was made very apparent by first altering the steering to the oblique position, when each wheel made a separate track in turning, and then throwing in the regular gear, the rear wheels describing the same arc as the front ones. The difference was noticeable at once in the additional work done by the motors, as shown by the ammeter, which indicated an increase of several amperes.

Construction of the Wheels.

The interesting features of the truck, apart from the steering, are centered in the wheels, each of which is formed of two deeply dished disks, between the edges of which the tire is secured. Inside of each disk, close to the tire, is a slightly beveled gear ring, having 225 teeth. The wheel revolves on a short axle hung on a steering knuckle, in the usual manner, and has two roller bearings, one at the hub of each disk. Between the disks and in effect forming part of the axle, the 2-horsepower electric motor is placed, its shaft being horizontal and approximately in the plane of rotation of the wheel. Each end of the shaft carries a nine-tooth pinion, two inches long, one meshing with the gear on one

FRONT AND REAR WHEELS SET AT OPPOSITE ANGLES.

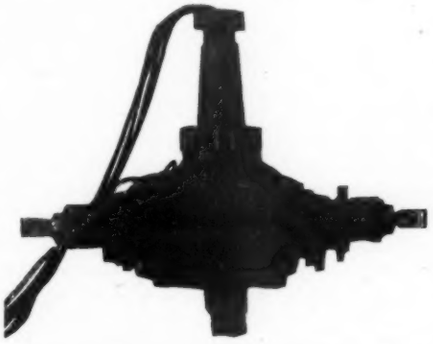
ALL WHEELS SET AT SAME ANGLE FOR OBLIQUE MOVEMENT.

disk and the opposite pinion meshing with the gear on the opposite disk, the motor being set slightly askew to permit of this. Thus, both pinions drive the wheel in the same direction, instead of working against each other and locking the motor, as would be done if the pinions engaged on opposite sides of the same gear. The ratio of gearing is 25 to 1.

Equalizer in Armature Shaft.

In order to overcome the mechanical difficulty of making both pinions mesh exactly with their respective gears, the motor shaft is divided on the opposite side from the commutator and an equalizing device is inserted to distribute the driving force equally to both pinions. As a result of this double drive, the bearings of the wheels have only the dead load of the vehicle and its lading to support, for, the power being applied on both sides of the axle, there is no unequal pressure on the bearings, and considerable friction loss is avoided, not only in the bearings but in the gearing itself.

Reference to the illustrations will make the construction clear, it being understood that the motor is held stationary while the hollow wheel revolves around it. The stubs which form the journals of the axle are



HUB MOTOR, SHOWING STUB JOURNAL AND WIRES, ROLLER BEARING AND DRIVE EQUALIZER.

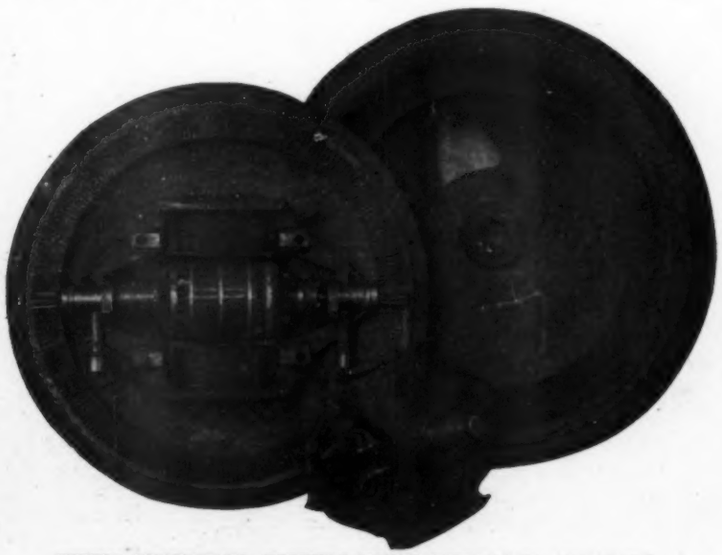
solidly secured in the metal of the field castings. The part that is attached to the knuckle is tapered and the end threaded, and is held in its socket by a large nut. A stout steel key holds it from turning. A brass cap on the outer end excludes dust and dirt from the bearing. Incidentally, the motors are protected thoroughly from dirt as well as from accidental injury.

Oil cups hung below the bearings supply lubrication through wicks to the motor bearings, which are of bronze. The wires from the motor lead through the axle, which is hollow, and sufficient slack is left to allow plenty of flexibility. Brake bands are attached to each wheel, and are large and strong. There are two brake pedals, one working the brakes on the two forward wheels and the other the brakes on the rear wheels. These brakes are efficient in action, as was shown when climbing the Lexington Avenue hill, one set being sufficient to hold the truck, weighing, with its load, more than eight tons, on the 16 per cent. grade, without special exertion on the part of the driver.

Long Life of Battery.

The battery, which consists of forty-two Exide cells, type MV 15, was installed in February, 1904, when the truck was com-

ONE HALF OF WHEEL, SHOWING MOTOR ENCASED.



WHEEL DISSEMBLED, SHOWING MOTOR FIELDS AND ARMATURE.

pleted, and although it is said the truck has been in constant service since then, having run about 2,000 miles, the battery is still in excellent condition. It is said that not a plate has been replaced. An inspection of the plates shows that they are, apparently, good for a considerable amount of hard work before renewals will be necessary. This lack of wear and tear on the battery is attributed to the efficiency of the transmission and the directness of application of power to the work to be performed. The greatest mileage made on a single charge of the battery was forty-nine miles. The batteries were not exhausted, however, no attempt having been made to reach the limit.

SMALL WEAR ON TIRES AND GEARS.

An interesting point is the condition of the tires, which are of solid rubber, thirty-six inches in diameter and five inches section. They are smooth and show almost no wear. In fact, the rear tires look almost new, while but slight evidence of wear is visible on the front ones, which break the way, so to speak, for the rear wheels that follow in the paths made by the front ones. The wear on the bearings and gears is also slight. On the pinions, which might be expected to show some of the effects of long use, there was no appreciable wear, the teeth only being worn smooth. The wide area over which the wear on the gears is distributed ensures long life. Each pinion has to transmit only one-eighth of the whole power used, and as each pinion is two inches long, the wear is little more than would occur if the entire power were transmitted by a single pinion and gear with teeth sixteen inches long.

If one or two motors become disabled, one or both can be cut out and the truck propelled by the others. Even one motor will drive the truck up a slight grade, being susceptible of an enormous overload for short periods, and considerable overload continuously. Should the steering of one pair of wheels meet with an accident, that pair may be disconnected and the steering done with the other pair, which happened once, while a heavy load was being carried.

The battery is carried in a box slung under the middle of the truck platform. The platform is twelve feet long and six feet wide. The wheelbase is about 100 inches and the tread six feet. Without load, the truck weighs about four tons.

This truck, which is the property of the Holson Motor Patents Company, Ltd., of Grand Rapids,, Mich., was built in Chicago a little more than a year ago. Since leaving the shop where it was constructed, it has been in constant use for demonstration in various parts of the country, and was brought to New York in November, by M. B. Church, the general manager of the company.

The owners of the patents will probably arrange for the manufacture of the wheels, motors and steering gear, which will then be sold for attachment to existing vehicles, as this can be effected without serious difficulty. Pleasure vehicles will be considered later on. The vehicle illustrated herewith is the only one built as yet.

HOME-MADE GASOLINE BUCKBOARD BUILT BY NEW YORK BOYS AGED TWELVE YEARS.

LIGHT STEAM RUNABOUT BUILT BY NEWARK BOY EMPLOYED IN REPAIR SHOP.

Boys' Home-Made Autos.

French boys have proved themselves exceedingly clever in imitating, on a small scale, the outward appearances of automobiles of various types, some of these miniature cars being such faithful copies that without the means for making comparisons the eye might readily be deceived at a distance. These ingenious toys possess a serious drawback, however, for they are without motive power, depending upon gravity for their propulsion. Their finely formed and gaily painted bodies are empty.

Young America, on the contrary, cares little or nothing for outward appearance so long as he can put together something that has motive power that will carry him with it.

Two striking examples of this are shown in the accompanying photographs of machines built by boys for their own use. The "steamer" was built by L. J. Wyckoff, of Newark, N. J., a lad employed in an automobile repair shop; and doubtless the young owner derives much pleasure from the work of his own hands. He drove in it to the Eagle Rock hill climb on Thanksgiving day, where his production attracted considerable attention.

The gasoline "car," of the buckboard type, was built by two twelve-year-old boys, Woodruff Halsey and E. J. Dimrock, of New York city. The engine is a bicycle motor of 1 3-4 horsepower, driving one rear wheel through an original and "specially designed" transmission. The most valuable feature about these two vehicles, in the eyes of their builders and owners, is that both will "go" under their own power and carry the boys at good speed.

Frank Sparling, the South Locust street groceryman, is the owner of an automobile that arrived from Kansas City Thursday. It is a gasoline "runabout," similar to the machine owned by Harry Brown. Mr. Sparling gives promise of becoming an experienced "chawfer."—*Chillicothe (Mo.) Democrat.*

Winter Shopping with Autos.

Far from disappearing with the first fall of snow, the automobile is this year more in evidence than ever before in New York at this season. Cars of all descriptions are seen ranged along the curb throughout the shopping centers, and the "toot-toot" of the horn is heard on every thoroughfare, both uptown and in the financial quarter. What motoring means to the chauffeur of a livery cab on a snowy day is shown in one of our pictures; the lofty heights of his seat invite the wintry breezes which sweep across the city from river to river and whirl the eddying snow in all directions from the tall buildings.

The other side of the picture is shown in the second view—one of the most elegant of the new closed private gasoline cars departing with its owner from the entrance to a store. The car is fitted not only for city work, but has the power for suburban driving and touring.

The photograph presents an ideal picture of winter traffic conditions in the metropolitan shopping district during last Monday's heavy snowstorm. Immediately behind the automobile is a powerful electric sweeper for clearing the snow from the street car tracks and preventing the blockades that so quickly tie up a whole line of cars. To the right is a car moving in the opposite direction on slippery rails. These and the packing snow on the asphalt paving combine with the blustery wind and driving feathery flakes to make the threading of the maze a feat to test the ability and the composure of the most expert driver.

PRIVATE GASOLINE COUPE TAKING ITS OWNER FROM A RETAIL STORE DURING SNOWSTORM

AN ARMY MOTOR AMBULANCE.

There has just been completed in England a motor car which is intended to give complete protection to the Royal Army Medical Corps while on service in the field, and as this purpose would be of the greatest of importance in times of war, the British War Office and the heads of the R. A. M. C. at once arranged for an inspection of this latest addition to the ranks of automobilism. The car was built by the Ivel Agricultural Motor Co., the motor itself being built for heavy work on the same lines as the agricultural motors turned out by this concern, and being capable of hauling not only a heavy service cart, but also a passenger load of nearly thirty persons. The car is protected by armor shields built of quarter-inch bullet-proof steel, and successfully resisted all attempts made to penetrate its wall in a recent trial at Bisley. The walls, however, can be folded together, while the ambulance motor, as it has been dubbed, is in motion, but on their being spread out a large red cross appears on each shield, as a sign to friend and foe that the vehicle is used only for hospital purposes, bringing first aid to the wounded.

All the authorities have expressed their satisfaction with the car, which will probably be added to the service wagons of the Royal Army Medical Corps.

DRIVER OF ELECTRIC CAB IN NEW YORK AWAITING SHOPPER IN MONDAY'S STORM.

BRITISH 1905 RELIABILITY TRIALS.

At a recent meeting of the Industrial Committee of the Automobile Club of Great Britain and Ireland an outline of the coming reliability trials was given. It was at first suggested that they should be of a purely national character, open only to British-made cars, but this proposal was lost on the motion of Captain Deasy that the trials be open to all nations, but that cars of British manufacture be entered as such and so described in the program.

The classification will be by chassis price. The following classes were agreed upon: Class A, cars from £220 to under £300; Class B, £300 to under £400; Class C, £400 to under £500; Class D, £500 to under £650; Class E, £650 to under £800; Class F, £800 to under £1,000; Class G, £1,000 and upwards. Touring cars only are eligible, and no maker nor agent shall enter more than one car in any class. The distance is to be 2,000 miles and the horsepower is not limited.

The club executive committee has adopted the rules for the 1905 Gordon Bennett selection race, as prepared by the Race Committee, so the coming events are well under way in the various departments of that busy corporation.

"Jinx is awfully proud of that funny little motor car of his."

"Wonder why?"

"Oh, you can smell it a mile further off than any other make!"

—*Motoring Illustrated.*

Pedal and Lever Manipulation.

THERE is no better evidence of the expert driver than that perfect manipulaiton of the speed-change mechanism by which an even and quiet movement of the car is assured under all conditions, and the first efforts of the novice should be directed to this end. There may come a time, though even this is doubtful, when he will be justified in displaying his skill by sudden starting and other abrupt gyrations; but at the outset, and for some time after, his efforts are best concentrated upon the safe and certain handling of the mechanism without damage to gears, and to the avoidance of that disagreeable noise which gives public evidence of carelessness or lack of skill. An English exchange, *The Motor*, gives some plain instructions for the handling of the Panhard type of sliding gears which are applicable to the many cars thus fitted that are in use in this country.

The general arrangement of the cone clutch, the gear shafts and pinions, and the hand and foot levers, are presumably familiar from frequent descriptions and illustrations, and it will be assumed that the driver is seated in the car with the motor running and the clutch in, the change-speed lever being in the neutral notch of the quadrant. The gear wheels on the main shaft are now in motion, and any attempt to throw the hand lever forward is likely to result in the immediate grinding of the teeth of the live and dead gears as they come into contact; or, if this first maneuver prove successful and the gears actually mesh without damage, the car will be suddenly started with a strain which may badly damage the engine or transmission gears.

Use of the Clutch in Starting.

The first movement in starting is to depress the foot lever controlling the cone clutch, thus disconnecting the motor and the main shaft; when the latter is motionless, the hand lever may be released and thrown forward, thus engaging the gears of the main and the secondary shafts. Possibly the gears may fail to mesh, as shown by the stoppage of the hand lever before it reaches the first notch of the quadrant; in this case the safest thing for the novice is to raise the foot, thus allowing the engine to start the main shaft, then to depress the foot and throw out the engine, waiting a few seconds for the main shaft to come to rest, when the hand lever may be thrown forward. Should there follow a grating noise, it will show that the main shaft has not yet stopped, and the hand lever should be withdrawn. Should the lever still refuse to move when tried again, it will show that the gears are not yet in the meshing position. In such case the lever is kept in the neutral notch, the pedal is released gently to give a slight motion to the shaft, it is then depressed, and when the shaft has again stopped, a new trial is made.

The usual method in this case is more rapid; if the gears fail to engage on the first attempt, the foot lever is slightly released, giving a slow movement to the main shaft, and as soon as this movement begins the hand lever is thrown on the chance that the gears may mesh. However justifiable this may be in the expert, it is likely to result in noise at the hands of the novice, and the more deliberate method is to be recommended until experience will warrant the other.

Slow Starting of the Car.

The first step accomplished and the gears being thrown quietly and easily into mesh, there still remains the full starting of the car. After the lever has been moved the clutch must not be suddenly let in with a jerk and a bang, but the foot should be raised gently, so that the engine power is very, very slowly communicated to the rear wheels.

The "quick start" method is one of the little tricks of driving suitable only for getting off the mark in speed trials, and quite out of place upon the road. If adopted, its foolishness will be brought out quickly by the effects upon engine, gears, and tires. Letting in the clutch quickly with the car at a standstill may stop the engine, strip teeth off the gear wheels, or skid the rear wheels over the road before they can secure effective traction; and this last effect may be emphasized if the weight is not evenly distributed throughout the car, or if the road is muddy. It must never be forgotten that the whole power of the engine can be suddenly thrown upon the gear shafts by careless usage of the clutch, and it is solely to secure gradual application of force that the entering clutch member is leather covered. The strain is thereby gradually distributed over the whole mechanism without excessive pressure upon a single portion.

If we use the clutch to ease the strain gradually from engine to wheel rim, it will continue to do what is desired; let in the clutch suddenly and something may break. If the clutch is in good order, the slipping action provided by the leather face is a ready means of car control in traffic without the necessity of changing gear frequently; the jerking or banging use of the clutch will quickly remove this slipping property, and incautious users will find that the clutch will take up only a position of "right in" or "right out" without any intermediate point. Complaints are occasionally made of what is called a "fierce" clutch. In other words, the clutch will not slide or slip in, but permits the engine to get hold of it suddenly, and almost takes the starting control from the driver's hands. If the design is correct (there are one or two clutches on the market with incorrect angles which nothing will remedy), the trouble usually can be traced to a stone-hard clutch leather, which has been ruined by unskilful usage.

From First to Second Speed.

We have eased in the clutch and started slowly off, but there need be no hurry to hasten in with the second speed. Allow the car to have good way upon it, say, by gradually advancing the ignition to half the limit the ignition lever permits, and now try to change up. The conditions are somewhat altered from the first point of standstill to movement; we have now to deal with a slowly-moving car, and we should endeavor to make it run at twice the speed without acquainting the whole neighborhood with the fact that the change is taking place.

The change must be made with certainty and at the first attempt. The proper meshing of the gears cannot be tried for, but they must be allowed to slide of their own accord, for when changing up, if the higher gear cannot be immediately attained, the car will lose its momentum, and when the second gear is eventually got in the extra work thereby put upon the engine will stop it. No great harm is done by this happening, but if in the midst of traffic, the proceedings are not of a dignified nature when the driver has to dismount suddenly, and turn the handle vigorously, being meanwhile the target of sarcastic remarks. To change the speed wheels to a higher gear, the clutch pedal must be depressed fully, so that the clutch is released entirely from the engine; when the clutch is right out, but not a fraction of a second before, move the lever quickly and surely from first speed notch to second speed notch and let the clutch in; the clutch movement may be very slightly accelerated beyond that advised for getting from neutral to first speed, but the movement must still be a gradual one until the clutch is fully home.

Difficulties of Speed Changing.

A part of the preceding sentence, "move the lever from first speed notch to second," is the stumbling-block to most men who find trouble in changing, combined with insufficient depression of the clutch pedal. After driving a car for some time the gear changing becomes as automatic as the steering of a bicycle, but at first many owners find it essential to look at the quadrant as the change is made, to be sure that the lever drops into the right notch. Some men never lose this habit of watching the quadrant, and night driving with them becomes almost a nightmare in hilly districts for fear of missing gear.

Now, nearly every change-speed lever is fitted with a spring clutch, which drops into one of the desired notches on the lever quadrant, and as a rule it is this catch which is the cause of part of the trouble. The driver, perhaps, clings tightly to the trigger after the lever has reached the side of the notch, and, letting in the clutch at the correct moment, the lever gets knocked back because the gear wheels do not mesh; or he lets go of the trigger but is uncertain whether the lever is against the notch or half-way between the two speeds. Anyway,

he trusts to luck, lets in the clutch, and we are treated to that delightful sound of grinding gear wheels with which we are all too familiar.

PROPER HANDLING OF THE TRIGGER.

There is an alternative to this haphazard method of gear changing, which prevents noise, ensures correct movement of the lever, and needs no watching of the quadrant. When the trigger is gripped (together with the lever), the time to let go is the moment the head of the catch tooth has passed the front edge of the notch; once released, do not touch it again. As the lever is pushed forward the tooth presses upon the face of the quadrant and quite naturally drops into the notch designed to receive it, stopping the lever in the correct position, without any muscular effort upon the driver's part or fear of passing the wished-for notch. Exactly the same use of the tooth and notch can be made for changing down or for getting in the reverse. This method depends entirely upon not letting go the trigger too early, as the lever starts to move, or the lever will be forced back into its original position. If carefully practised for a few minutes with the engine stopped, it will be found possible to depend entirely upon the sense of touch. The changes thus made should be tried with every gear in turn; at first it will be necessary to watch the quadrant to find the exact moment the lever has passed the old notch and is making for the new, so as to drop the tooth upon the quadrant face. Some drivers will find that it suits them better to drop the tooth midway between notches; in this respect the personal equation comes into action.

SPEED CHANGES ON HILLS.

For changing down speeds on a hill, the lever movement will, of course, be carried out upon a similar method; but for hill work the clutch must be taken out sharply by the foot, and as the foot gets the pedal down to its limit of travel the hand is prepared to pull the lever back quickly to get into the lower speed when the clutch can be let go.

Working the clutch uphill requires somewhat different treatment from work upon the level, for the speed of the car is diminishing by reason of the resistance offered by the gradient, and, therefore, the clutch must be released quickly, the change-speed lever moved quickly, and the clutch again let in quickly, but without a symptom of jerkiness or harsh movement. If the speed gets slow uphill, the change must be made with rapidity, and, perhaps, jerkily, when the engine labors and "knocks," or the car will come to a standstill; this can always be obviated by changing gear before the engine reaches that stage of weariness.

In changing gear remember the golden rule whether on the level, uphill, or reversing: *Always*, without any exception, entirely disengage the clutch before attempting a change.

Oiled Roads in Scotland.

During the past summer the western section of the Scottish Automobile Club conducted experiments in the prevention of dust on roads by the use of westrumite and crude oil, writes Rufus Fleming, American Consul at Edinburgh.

Two stretches of roadway were selected, about half a mile in each place being treated, in which the metaling was in three stages of wear. Half a ton of westrumite was used in each case. Previous to the first application the road was cleaned and swept, then a 10 per cent. solution was applied by means of ordinary watering carts. Three days later another 10 per cent. solution was applied, but within a few hours of the second application a torrential rain, which washed away a considerable portion of the mixture, fell over the district; consequently a third 10 per cent. mixture was applied, instead of two successive applications of 5 per cent., as was originally intended.

Crude oil was used over a stretch of road comprising metaling at two stages of wear. The road surface was swept clean and the oil poured on by means of cans, and brushed over so as to saturate the surface uniformly.

In a report on the results, the secretary of the club says, in substance:

In about twelve hours after the application the road surface was dry enough in each case to take the traffic, and not a single complaint of damage done to the tires or paint of any vehicle thereby has been made. In the case of westrumite, for several weeks there was absolutely no dust raised by vehicles of any description passing over the road, and even three months afterwards there was but little dust. On the older portions, where the metal is much worn, the tendency to dust is greater than elsewhere. As to the crude-oil experiment, the results obtained from the different stages of wear of road surface are not so noticeable. This material is most effective, but for the first week or ten days after its application, especially if wet weather prevails, it is not so clean as the westrumite; neither is it so easily applied nor so clean to handle. There is one point in its favor—one application suffices for a season. With the westrumite several applications are necessary, at intervals varying according to the nature of the weather and the condition of the road.

The experiments have been so far successful, and have demonstrated the efficiency of the materials used for the purposes of dust prevention. The cost to the club has been approximately $100 per mile, which may be accepted as a fair average of the cost of this method of road dressing. For long stretches of road in the country the cost of the application might make its general use prohibitive, but in villages or populous places or residential districts the complete absence of dust in dry weather would be appreciated, and would be well worth the expenditure required.

DESIGN FOR VINCENZO FLORIO SILVER TROPHY OFFERED FOR ITALIAN GORDON BENNETT RACE.

This is a new challenge trophy, offered by the Italian sportsman, Vincenzo Florio, to be competed for in seven consecutive years, in Northern Italy, by cars weighing less than 2,204 pounds. The races are to be run over a distance of from 497 to 621 miles, and must always be run in Italy. A *fac simile* in miniature of the trophy is to be awarded each year to the owner of the winning car, and the original will be presented at the end of the seven years to the makers of the cars that have won the largest number of the annual contests. Rules for the Brescia race will follow in general those for the Gordon Bennett cup contest. The races are to be run during "Brescia Week," also known as the "Brescia Circuit," about the end of August.

A Theoretical Investigation into the Possibilities of the Gas Turbine.

UNDER the above title, a paper of considerable interest and suggestiveness was read before the last meeting of the Institution of Mechanical Engineers, in London, by R. M. Neilson. It was purely a theoretical paper, in which the ideal efficiencies of different cycles were investigated, with a view to indicating in what directions the greatest promise of success seems to lie. To this end a number of hypothetical cases were considered, and ideal diagrams worked out from the data assumed.

Four cycles were examined, the first two being those designated by Dugald Clerk types 2 and 3, here called, respectively, Cycles 1 and 2. Cycle 1 is the combustion-at-constant-pressure cycle used in the Brayton engine. In this, as in all the cycles, the investigation is based on an assumed weight of gas being first compressed more or less, then heated more or less, either with or without expansion, then expanded beyond the original volume to atmospheric pressure, and finally cooled and compressed at atmospheric pressure to the original volume. This, of course, does not represent the actual processes in a gas engine in which successive weights of gas are taken, but it is the most convenient method for theoretical investigation. In all the examples taken, the specific heats are supposed to be constant at all temperatures as pressures, being 0.238 at constant pressure, and 0.17 at constant volume. It is assumed also that the weight per cubic foot of gases is 0.777 pounds at a pressure of 15 pounds per square inch absolute, and a temperature of 17 degrees C. The product of pressure and volume is supposed to be constant for isothermal expansion and compression, and to be constant with all pressures and temperatures. All the curves are true isothermal and adiabatic. It is pointed out that the ideal efficiency of an engine working on Cycle 1 is equal to $\frac{T-t}{T}$, where T is the temperature at the end of combustion, and t the temperature at the end of adiabatic expansion.

It is assumed that a turbine of the Parsons type, with steel blades, could not stand a temperature in excess of 700 degrees C. without some water-cooling device, and this temperature, or 973 degrees absolute, is made the limit in several of the assumed cases.

Starting with these premises and with an initial temperature of 17 degrees C. (290 degrees absolute), and a corresponding pressure of 15 pounds absolute, a trial is made of compressing to 42 pounds absolute, producing a temperature of 389 degrees absolute. Heat is now supplied, and the gas expanded at constant pressure, till the temperature is 973 degrees absolute, the allowable maximum. Gas is expanded without further addition of heat to 15 pounds absolute, and the ideal efficiency is found to be 0.25. The negative work represented by the compression curve is 0.4 of the gross

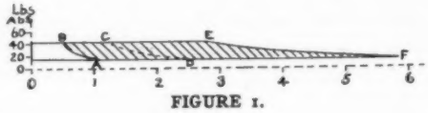


FIGURE 1.

work done. It is pointed out that in a turbine there is little difficulty in carrying the expansion line down to atmosphere, although that would be impracticable in a reciprocating engine.

Although water cooling would be out of

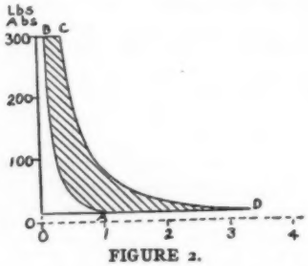


FIGURE 2.

the question in practice for a turbine, the author assumes cases in which the temperature is carried to 2,000 degrees C. (2,273 degrees absolute) for a purpose which will later appear. Compressing the gas to the same pressure as before, and

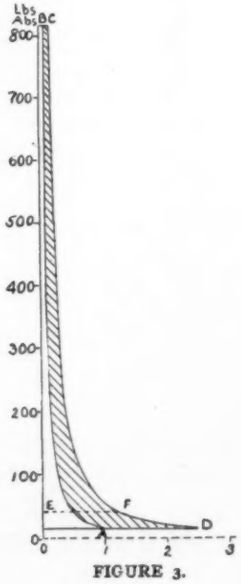


FIGURE 3.

continuing the application of heat till 2,273 degrees absolute is reached, the curve shown in Fig. 1 is obtained, in which the dotted line $C\,D$ shows the expansion curve in the first case assumed. The ideal efficiency with this engine is 0.25, as before, the amount of heat applied making no difference in this respect, but the negative work is now only 0.171 of the gross work.

With the higher maximum temperature it is practicable to use a much higher compression than first assumed. If the compression be made 300 pounds absolute, the curve obtained in Fig. 2 is obtained, with a maximum temperature of 2,273 degrees at C. The ideal efficiency is now 0.58, and the ratio of negative to gross work 0.3. The temperature at the end of compression is 682.5 degrees absolute, or a little less than one-third the maximum. In other words, this curve is about what might be produced by a medium quality of gas heated by its own combustion. In this respect it differs from the preceding case, where the amount of heat supplied is greater than would be produced by the combustion of the gas itself.

If the compression in Fig. 2 be carried to such a point that the ratio of negative to gross work be 0.4, as in the first case assumed, we get Fig. 3, in which the ideal efficiency is 0.68. Although this shows much the higher efficiency, it is evidently impracticable on account of the excessive pressures employed, even were the negative work less.

The author now supposed that, instead of discharging the hot gases directly into a turbine of the Parsons type, they be directed through suitable divergent nozzles against the vanes of a turbine of the De Laval type. By doing this the gases may be cooled by their own expansion, so that no water cooling is necessary, even with a maximum temperature of 2,000 degrees.

If the case represented in Fig. 2 be taken and the gas allowed to expand adiabatically in a suitable nozzle to atmosphere, it will have at the end of expansion a temperature of 966 degrees absolute, which is just within the permissible limit. As the energy represented by its pressure is now converted into kinetic energy, a theoretical calculation shows the velocity to be 5,290 feet per second at the mouth of the nozzle. This is about 900 feet per second in excess of the theoretical velocity of saturated steam at 300 pounds absolute pressure, and of course, both are considerably in excess of the velocities which would be obtained in practice, owing to the friction in the nozzles and to the resistance of the surrounding air or gases. No such vane speed as would be indicated by these theoretical figures would be possible in practice, as the resulting centrifugal force would burst any wheel that could be made.

If the gas be compressed as in Fig. 3, and expanded in a divergent nozzle, it will reach 973 degrees absolute, with a pressure of 42 pounds absolute, so that 27 pounds can be dropped in the turbine. The theoretical veloicty will then be 5,280 feet per second.

The sources of loss with any of the foregoing cycles will be as follows: Radiation and conduction, fluid friction, friction in bearings, and loss due to incomplete ex-

pansion. The first loss will be larger than with steam, but less than with reciprocating gas engines, owing to the higher velocities and higher permissible temperatures. The second loss will be considerable, but much less than in turbines using anything but highly superheated steam. The third and fourth losses should be small. Another source of loss, however, which may be very considerable, is the friction of the compressing pump. On account of high pressures, it is evident that reciprocating air compressors would be very inefficient unless compounded. Largely for this reason it is important to keep down as much as possible the ratio of negative to gross work, the need for this being illustrated by an extreme case. Suppose that the ratio of negative to gross work in an ideal engine is 0.5; that is, that the pump requires one-half the gross power of the machine, there being no friction. If now the machine is not ideal, and if the mechanical efficiency of the pump is only 2-3, and that of the motor proper only 3-4, no useful work whatever will be got out of the machine, the whole being absorbed in friction. For example, if the total power of the motor is 100, and the pump requires 50, the pump will take 75 if its efficiency is 2-3. This is exactly what the motor will give out after deducting friction, and therefore there will be no external work done.

Two cases are assumed of engines working on the modified Otto cycle, here called Cycle 2. In the first case, an ideal efficiency of 0.55 is realized, with compression to 101 pounds absolute, and an increase of temperature to 2,273 degrees absolute, raising the pressure to 459 pounds absolute. In the second case an efficiency of 0.68 is obtained, with compression to 417 pounds absolute, and an explosion pressure of 1,265 pounds. In both cases expansion is continued to atmospheric pressure.

The third cycle involves absorption in a water-jacket of a portion of the heat generated, and the conversion of this water into steam, partly by boiling and partly by heating of the waste products of combustion. This steam is then discharged, either with the burnt gases through a common nozzle, or simultaneously through a separate nozzle, and an analysis is made of the efficiency thereby obtained. It is shown that with pressure of 300 pounds (the Brayton cycle being used), the steam being generated at 300 pounds absolute and superheated to 700 degrees C., the combined efficiency is only 0.33, as compared with 0.58 for Fig. 2. Various methods of accomplishing this process are discussed, and the possibility is considered of expanding below the atmospheric line by condensing the steam, simply using a vacuum pump. Evidently a very large vacuum pump would be necessary; but, on the other hand, experiments seem to have shown that there is a great loss in the velocity of gas and steam jets from nozzles, when they have constantly to push away the surrounding air. As to whether the advantage gained by condensing would be worth the cost, the author expresses on opinion.

In Cycle 4 the author presents a novel system of his own contriving, in which a very low compression is used, and the compressed gas heated by passing through a regenerator before fresh heat is supplied. The regenerator is kept hot by the exhaust gases, and the theoretical merit of the cycle is that it combines high ideal efficiency with low ratio of negative to gross work. Its disadvantage is that much heat will be wasted in the regenerator, and that the latter, which would have to be of fire brick, on account of the high temperature at which the gases exhaust, would generally be awkward to install. It is pointed out, however, that regeneration would be practicable with Cycle 1, and, as the temperatures dealt with are there much lower, the regenerator could take the form of simple iron exhaust pipes, around which the compressed charge would pass before ignition.

The author concludes by pointing out that for small units, in which the gas turbine might replace the electric motor, simplicity and low first cost are of more consequence than a high degree of economy, and for this class of work he suggests that Cycle 1, using a low compression, would be the most suitable. For authoritative opinion regarding relative efficiencies in larger motors, he points out that further knowledge is first necessary regarding radiation losses and transference to high pressures, regarding the expansion of hot gases in divergent nozzles, and regarding radiation loses and transference of heat from gases to metal at high temperatures.

The Bates Muffler.

A muffler devised with a view to reducing the volume of the exhaust gases as much as possible, by cooling before discharging them, is soon to be put on the market, and is shown in the accompanying illustration. The object of cooling the gases is of course to reduce their volume and thereby to reduce the necessity for obstructing their flow.

The muffler is cylindrical in form, and is placed lengthwise of the car, the left end in the engraving being the front end of the muffler. The gases may enter at either or both ends, and a cut-out may be placed at the unused end. The central chamber *A*, which the gases enter first, is several times the volume of the engine cylinder and therefore gives the gases a chance to expand. The holes *B B* are likewise at least equal in total area to the cross-section of the exhaust pipe, and on passing through them the gases are still further expanded in the outer chamber *C*. Through this chamber pass several flues, *D*, open at both ends for the air to pass through freely. The exhaust gases enter these flues by the short pipes *E E*, which are directed backward into the tubes so that the issuing gases assist the motion of the vehicle in drawing cold air through the flues.

The cooling and condensation of the gases take place partly by convection through the walls of the flues and partly by the mixing of the air and gases in the latter. The muffler as shown is made with cast-iron heads and galvanized iron shells, and is surrounded by a jacket filled with asbestos fiber to deaden the noise. Necessarily this sacrifices a good deal of cooling effect, and it would seem that aluminum without the asbestos jacket might be preferable owing to the small resonance of that metal.

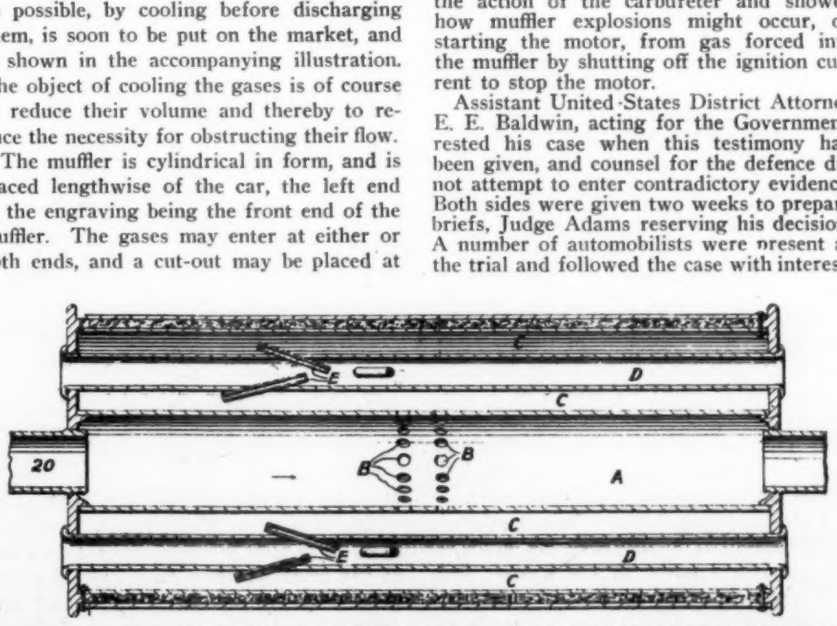
The muffler is made by F. E. Bates & Co., of Northfield, Minn.

FERRYBOAT TEST CASE TRIED.

Gasoline automobiles are sources of danger on ferryboats, according to the testimony of Professor F. R. Hutton, of Columbia University, New York, and Professor Jacobus, of the Stevens Institute of Technology, witnesses for the Government in the case of "the United States vs. the steam ferryboat *Texas*," tried before Judge Adams in the United States District Court, New York City, on December 14.

The case was instituted as a test of the Federal law regarding the carrying of automobiles on ferryboats, which is interpreted by the steamboat inspectors in such a way as to bar gasoline and steam automobiles from entering and leaving ferryboats under their own power. The witnesses explained the action of the carbureter and showed how muffler explosions might occur, on starting the motor, from gas forced into the muffler by shutting off the ignition current to stop the motor.

Assistant United States District Attorney E. E. Baldwin, acting for the Government, rested his case when this testimony had been given, and counsel for the defence did not attempt to enter contradictory evidence. Both sides were given two weeks to prepare briefs, Judge Adams reserving his decision. A number of automobilists were present at the trial and followed the case with interest.



MUFFLER DESIGNED TO REDUCE VOLUME OF GASES BY COOLING BEFORE DISCHARGING.

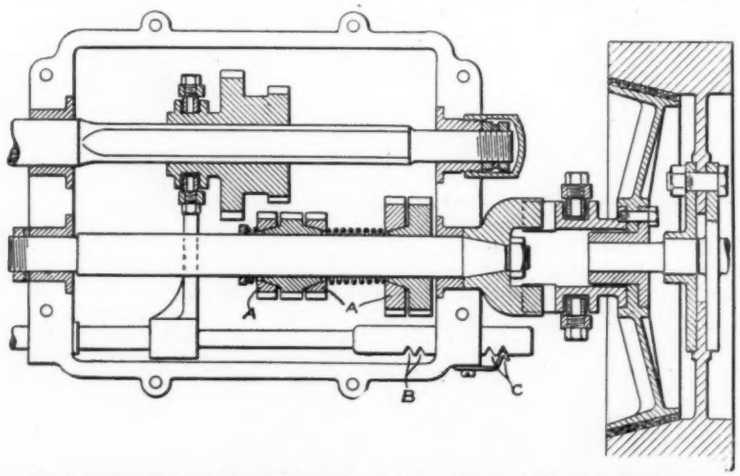
Shock Absorbing Change Gear.

The technical defect of the sliding gear system of changing speeds is, as is well known, the severe shocks imposed on the gears when shifting from one speed to another. On account of these shocks, the gears have to be made of much more costly material than would be necessary were the regular driving stresses the only ones encountered, and the clutch cone and other parts connected to them have to be lightened beyond what would otherwise be required. The drawback is practical as well as technical, since it reduces the availability of the sliding gear system for runabouts, in which speed changes would be frequent, and it adds to the skill and dexterity needed for operation. Even the most experienced driver sometimes finds it a little awkward, in a tight place in traffic, to adjust his motor speed just right for the most successful shift. The sliding gear train has won its popularity in spite of this feature, by reason of its high efficiency and light weight, and if its cost could be lowered and the danger of stripping the gears eliminated, it is not improbable that it would soon be used, to the practical exclusion of all other change speed gears.

Such a non-stripping device would most naturally take the form of a shock absorber of some sort, which would relieve the engaging gear teeth of the duty of accelerating or retarding the clutch shaft to suit the newly-meshed pair of gears. Unfortunately, none of the few contrivances yet put forward has shown itself to be a conspicuously apt solution of the problem, though we recall a foreign device for halving the usual shock by means of a claw clutch connecting the driven gear shaft with the final drive. By releasing this clutch at the same time as the flywheel clutch, both gear shafts are free to turn.

A device which has not been marketed, but which is at least sufficiently practical to stimulate interest in the subject, has lately been patented by S. W. Rushmore, of Plainfield, N. J. Its principle is shown in the accompanying engraving. It consists essentially in attaching to each of the gears which it is desired to protect one or two—as the case may be—"buffer gears" *AA*, which are loose on the shaft, but frictionally connected to the driving gear by a stiff spring clutch, preferably of conical form to save bulk. On changing speed, engagement is first made with the buffer gear, which slips and accelerates or retards the driving gear by friction. It is proposed to put deep position notches *BB, CC*, in the shifting bar or quadrant, which will be engaged by roller arms with heavy springs, so that shifting can only be done by a series of jerks, like a street car controller, instead of gradually, as at present. Then a quick shift is made to the buffer gear—first notch—by a sudden push, and by the time the operator has steadied himself for a second push—to the driving gear—that gear has been accelerated and goes easily into mesh.

Obviously not all the gears need this sort of protection, and it would be applied only to those—generally the intermediates—getting the hardest usage.



CHANGE-SPEED MECHANISM WITH SLIPPING GEARS TO ABSORB SHOCKS.

"I think I'll try filling the tires of my automobile with illuminating gas," said the amateur chauffeur.

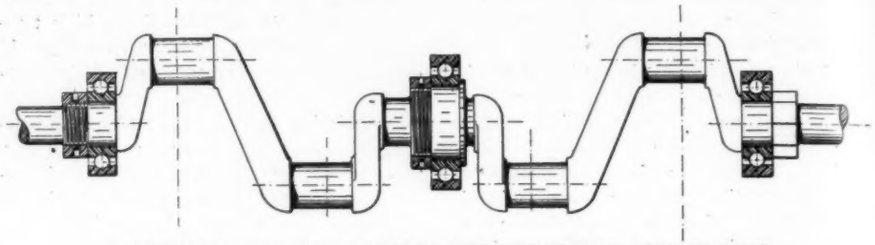
"Good joke," gurgled his fool friend. "Expect to make it light. Ha, ha!"

"Nothing of the kind," rejoined the amateur. "I thought it might increase the speed of the machine. Just think how the stuff makes the wheels of a gas-meter spin around.—*Columbus Dispatch.*

Ball-Bearing Crankshaft in New Mercedes Cars.

Special Correspondence.

BERLIN, Dec. 1.—The success of the ball bearings used in the wheels, change-speed gear and other parts of the Mercedes car, as shown in the diminished friction and the wonderful rapidity of starting, has led to the use of ball bearings for the crankshaft, as will be seen at the coming Paris show.



BALL-BEARING CRANKSHAFT ON NEW MERCEDES ENGINE AT PARIS SHOW.

The noted chief engineer of the Daimler works, Mr. Mayback, has worked for some time over the difficult problem of constructing a ball bearing that would withstand the shocks of the explosions as transmitted by the connecting rod, and only recently has he achieved a successful solution by means of springs introduced between the balls. Where other methods of ball-bearing construction have failed in a few months at most, through the many strains to which they are subjected, and in particular through the shock of the explosion, these retain their perfect condition indefinitely.

The details of construction are shown in the accompanying diagram. The outer bearings are secured by nuts on the threaded projections of the seats for the ball race. The center bearing seat is made of such a size that both ball race and nut may be passed over the webs of the cranks from the left end.

The arrangement has many advantages; the length of the motor is reduced and the mechanical efficiency is increased; especially when the motor is run at low speeds, the loss due to friction being much higher in proportion at low than at full speed; the wear on the main bearings is greatly lessened; the consumption of lubricating oil is decreased, and no harm results if the bearings should accidentally run dry.

Redolence that Suggests Tact.

By a scant decade, I do ween,
When a man smelt of stale gasoline;
You might have been sure
That the fellow was poor
And his duds had attempted to clean.

Now time quite a change doth reveal—
Your way you must cautiously feel;
You never can tell,
For that gasoline smell
May have come from his automobile.
—*Courier-Journal*, Louisville.

Features of Wolseley Racer.

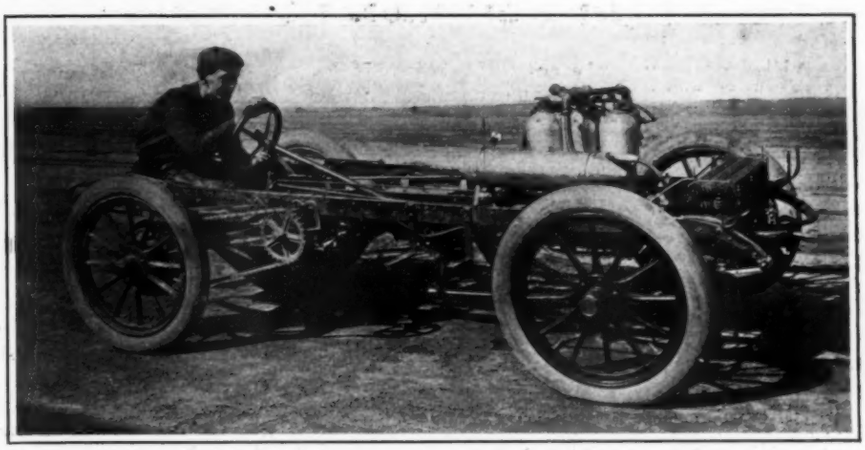
Several innovations in European design and construction are embodied in the Wolseley racing car of 96-horsepower, illustrated herewith, which ran second in the British Gordon Bennett elimination trials last May, and, driven by Sidney Girling, took seventh place in the race itself. It is interesting to note that this machine, built in Europe where the vertical motor in front is, as a rule, considered the only effective arrangement, has four horizontal cylinders below the top level of the frame—an arrangement that has become known as the "American type," owing to its wide and successful use in American runabouts and touring cars. Another peculiarity of the Wolseley racer is the location of the radiator in a position bak of the front axle, where it is protected against injury by contact with vehicles ahead.

The motor is of the type used in the regular stock Wolseley cars, and has cylinders of 6 inches bore and 6 1-2 inches stroke. Four forward speeds are provided by the transmission gear, and are theoretically twenty-five, forty-two, fifty-seven and seventy-three miles an hour. A reverse is, of course, fitted. Power transmission is by chain, a Renold silent chain running from the motor shaft to the gear box, and side chains from the countershaft to the rear wheels, which run on a "dead" rear axle. An enormous flywheel is used for the purpose of causing the car to accelerate its speed rapidly.

Strength in resisting lateral strains is imparted to the wheels by auxiliary spokes of steel wire. Ball bearings are used throughout the gear box and in the road wheels, and balls are also used in an external crankshaft bearing. All braking is done on drums on the rear wheel hubs.

Wired tubing, one-quarter inch in diameter, forms the radiator, a large number of tubes being used, and a fan being placed behind the radiator. Circulation is maintained by a rotary pump driven by a telescopic and universally jointed shaft. A single carbureter supplies gas for all four cylinders. The spark plugs are of large size, and there is a spark gap on each high tension lead. Cut-out switches for testing purposes are fitted to the low tension wires. The car has a wheel base of 108 inches, while the tread is 55 inches. The rear wheels are 36 inches in diameter with 5-inch tires, and the front wheels are 34 inches in diameter with 3 1-2-inch tires.

A sister to this car was driven by Charles Jarrott in the British Gordon Bennett elimination trials, taking third place, and in the race in Germany, in which it finished twelfth.



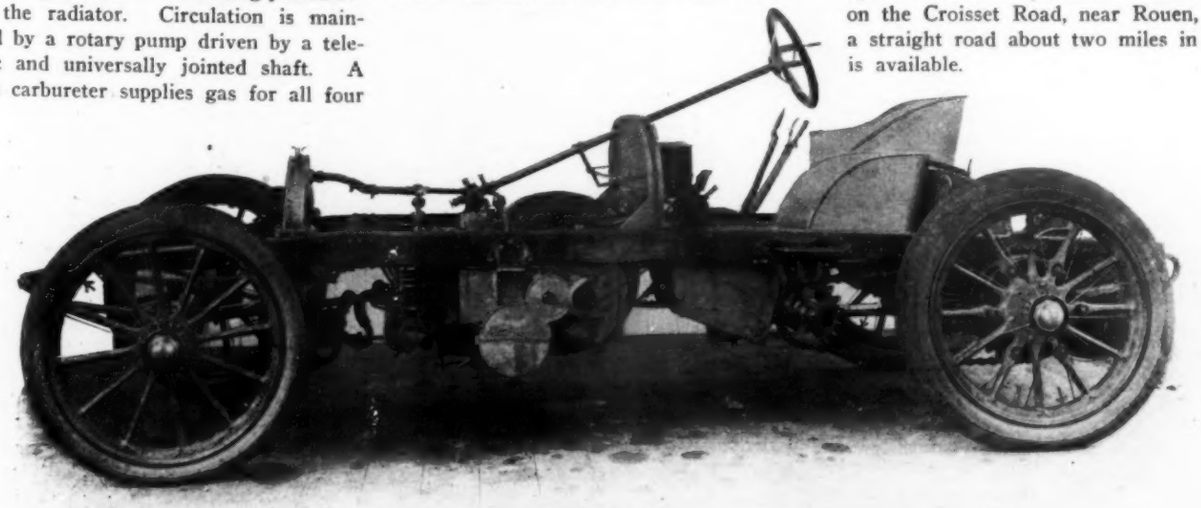
Stripping of a large touring car for racing is rarely carried to the extreme degree shown in the photograph reproduced above of the Thomas Flyer, which "made the running" at the Los Angeles, Cal., races in October. With this 24-horsepower, three-cylinder car, Frank Siefert, who is shown at the wheel, won the five-mile open, the Australian pursuit race and the ten-mile open for 24-horsepower cars. The Western Motor Car Company, of Los Angeles, which owned the car, not only removed the entire body, but changed the angle and length of the steering post, placed the driver's seat directly over the rear axle and on a level with the main frame, to lower the center of gravity, and provided a tank pointed at both ends and longitudinally disposed to reduce the air resistance. These changes gave the car an aspect greatly resembling the Ford and Premier light special racers of this year.

AUTOMOBILES IN QUEBEC.

Replying to a letter from an American interested in automobiles, who wishes to know the prospect of making sales of American automobiles and auto boats in Quebec, Canada, Consul W. H. Henry writes to the State Department:

"I have seen, as yet, only four automobiles in this city of 70,000 inhabitants. There must be a market for a great many more. If the motor for boats is any improvement on the present gasoline motors, I am sure there must be an opening for the sale of a great many of them among the large number of fishermen who have fishing rights on the numerous lakes and rivers in this vicinity. If some manufacturer would come here and attach his motor on a boat and demonstrate that it is better than any other, I am sure he would be able to make good sales."

The Automobile Club of France is arranging for an automobile straightaway speed contest to be held in March, 1905, on the Croisset Road, near Rouen, where a straight road about two miles in length is available.



WOLSELEY 96-H.P. ENGLISH RACER. WITH HORIZONTAL MOTOR AND RADIATOR BACK OF FRONT AXLE.

The Knox Models for 1905.

ONLY a few minor changes are made in the chassis of the new Knox pleasure vehicles for the coming season, but the body styles have been changed and improved, without, however, losing the individuality that has characterized the product of the Springfield factory heretofore. Three distinct styles will be manufactured—a runabout or stanhope, with single cylinder air-cooled engine, a folding back surrey, with two-cylinder opposed engine, and a side entrance touring car with a two-cylinder opposed motor.

In all styles of pleasure and commercial vehicles the company will use its standard air-cooled motor, mounted underneath the body, planetary transmission, and single chain drive to live rear axle. Several improvements have, however, been made in the engine and in the method of suspension in the chassis. A novel feature is the arrangement permitting removal of the transmission and access to the motor itself from the side of the car, without the necessity either of removing the body or of crawling beneath the vehicle. The motor and planetary change-speed gearing, which have a common shaft, are carried on a small, separate frame of angle steel that is pivoted on the engine side to the left side of the body frame, and on the transmission side is clamped to the right side of the body frame in such a way that the transmission side can be loosened readily and lowered part way to the floor. The engine and change-speed then incline at an angle and are in the most convenient position for examination from the side of the vehicle.

The engine and transmission, being disposed side by side on the same shaft and carried in a frame virtually independent of the body frame, are in effect a unit and cannot get out of alignment, regardless of the twisting movements of the running gear. This construction also permits the use of a lighter body frame.

The crankshaft in the double opposed engine has been shortened by placing the cylinders more nearly opposite each other and offsetting the crank-pin connection, thus bringing the main bearings closer together. The cylinders have 5-inch bore, as in the 1904 models, but the stroke has been shortened from seven inches to six inches. Three single piston rings are used, each having a peripheral groove to carry oil, instead of three sets of double independent rings, as formerly. The main shaft bearings are 2 1-2 inches in diameter by 4 1-16 inches long, and the crank-pins are 2 1-4 inches diameter by 2 1-2 inches long. The fly-wheel is lighter, being cast open, with fan spokes to draw the air away from the motor and establish a lateral circulation of air among the cooling pins. Cooling is further assisted by fans at the ends of the cylinders driven by belts running over pulleys on the time shaft, which is mounted longitudinally and is driven by a spiral gear from the engine shaft. The time shaft drives the make-and-break device, which is used instead of a commutator, and has cams that actuate the exhaust valves. The friction of this shaft has been reduced to a minimum by mounting it on adjustable ball bearings. The spiral gear is enclosed in the crank case. There is an improved adjustment between the rocker and exhaust valve stem. The carbureter has been provided with an automatic air inlet above the spray nozzle, and the automatic inlet valve has been changed to the top of the cylinder.

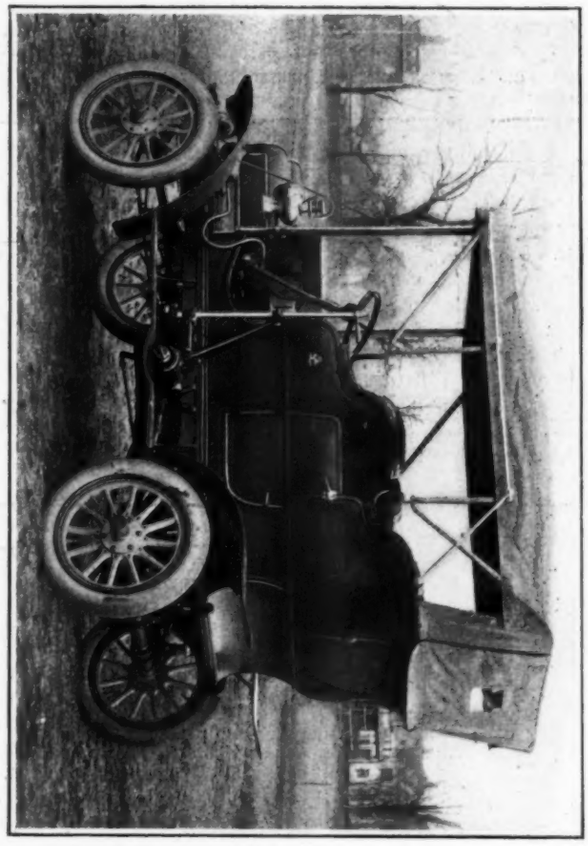
The lubrication system has been changed to a sight-feed oiler on the dash, with capacity for sufficient oil for a run of 150 miles. After the oil passes the sight feeds by gravity it is forced to the main bearings, the cylinders and the crank-pins. Only one grease cup is employed, and it is on the planetary gearing, one oiling of which should suffice for a day's run. The differential gearing is packed in grease, which should not need renewing more than once a season.

All of the new cars are hung from one to one and a half inches lower than last season, but still give eleven inches road clearance.

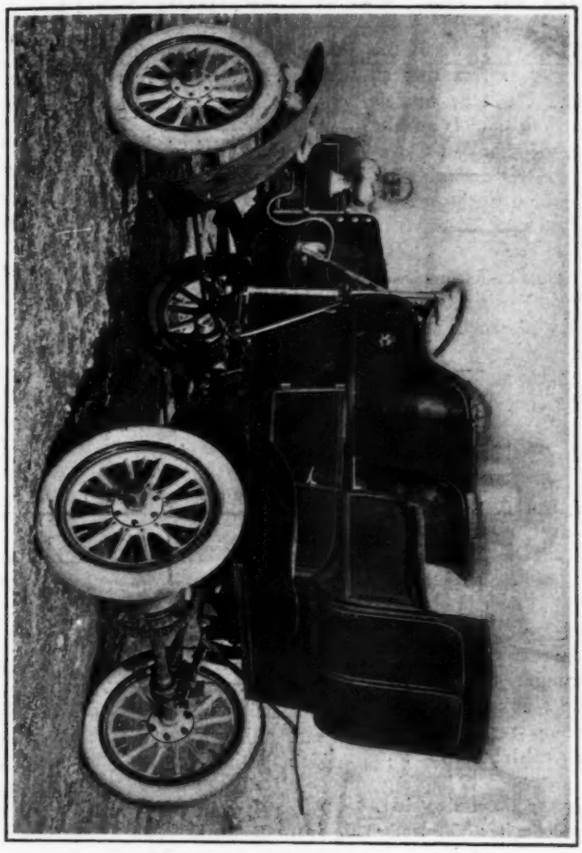
The new side entrance touring car, shown in the large engraving herewith, has a 90-inch wheel-base and standard tread. The wheels are thirty inches in diameter and are fitted with 4-inch tires. The car has an extended hood front twenty-seven inches long and seventeen inches high, affording two compartments. In the front compartment, which is the more accessible, are carried the batteries and spark coil, two sets of four No. 6 dry cells being used. The steering is either by wheel or side lever, as desired. The side steering cars are fitted with the Lemp steering check, making the steering irreversible. Steering and control of the car is from the left divided front seat.

The rear portion of the body is roomy, and is entered from the side through a nineteen-inch door that is hinged at the front. Should the door be insecurely latched, it will tend to close itself, instead of swinging back when the car starts and bend or break the hinges. The rear seat is fifty-nine inches wide. When desired, this car is fitted with an extended double seat Cape cart top and glass front. The same chassis will carry equally well a full limousine body.

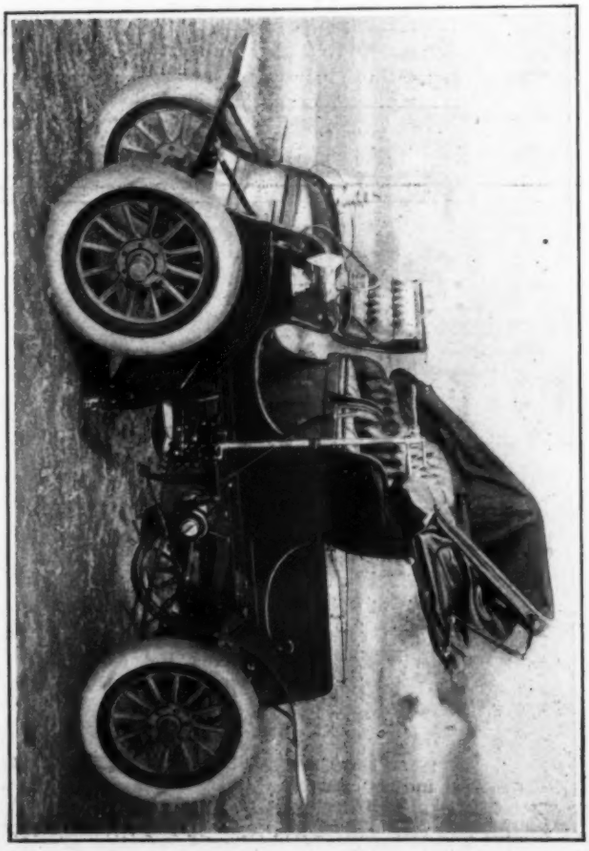
NEW KNOX SIDE ENTRANCE TOURING CAR, WITH TWO-CYLINDER, AIR-COOLED MOTOR AND BONNET FRONT.



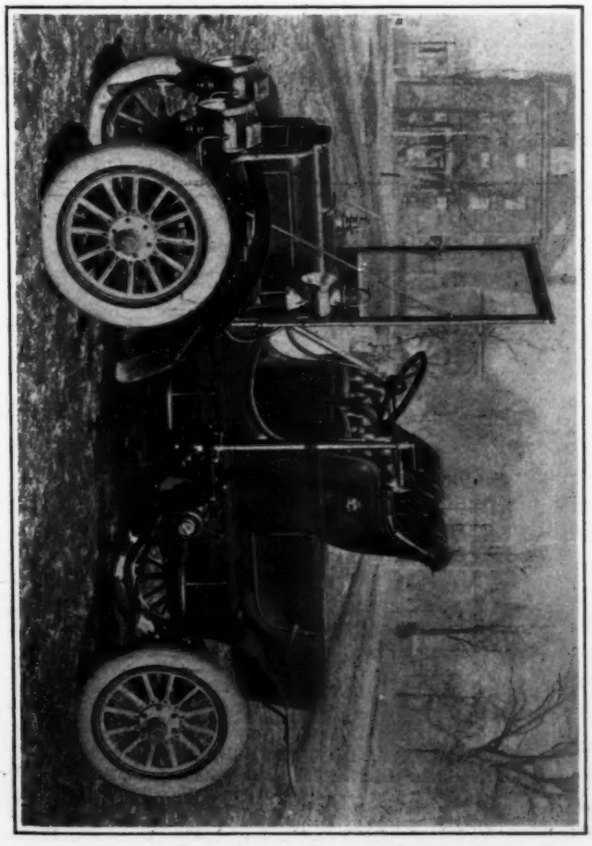
Knox 1905 Touring Car with Extension Cape Cart Hood Raised.



New Surrey Showing Folding Rear Seat Opened for Use.



Runabout Model with Folding Front Seat Opened.



Surrey Showing Rear Seat Closed and Front Glass Fitted.

INTERESTING MODELS OF KNOX CARS FOR THE SEASON OF 1905, DESIGNED TO MEET REQUIREMENTS FOR A VARIETY OF USES AND IN ALL KINDS OF WEATHER.

The space under the rear seat affords ample storage room for luggage and spares when touring.

The Knox surrey for four passengers, shown on the preceding page, presents interesting features in a car put out as a regular model. It is designed as a convertible vehicle peculiarly adaptable as a car for short pleasure rides for four passengers, or as a touring car for two, with generous storage room for luggage in the rear portion. In other respects similar to the touring car, the body of this vehicle has a folding rear seat, with high and comfortable back. When used by only one or two persons, the side panels, with arms attached, are removed from the rear seat and the back of the seat folded down, its top edge meeting and making a close fit with a hinged piece attached to the back of the front seat. Thus is formed a water-tight luggage compartment with doors on both sides. The wheel-base of this model is 87 inches and the tread 56 inches. The car is provided with a front glass and with a stanhope or victoria top for doctor's use when desired.

The single-cylinder runabout or stanhope is generally similar to the model of 1904, except that the wheel-base has been lengthened eleven inches, to 81 inches, and the body is made with a detachable rear portion. This part is made to slide backward for removal, leaving a flat platform, suitable for carrying a sample trunk, suit cases or boxes. The boards of the platform are removable, to give ready access to the engine and transmission. The top of the rear body portion is made watertight. The folding front seat that has been a feature of the light Knox cars heretofore is retained, but the main seat is of the individual or divided type.

"Jerrold wants to sell his auto."
"Indeed? Which of them is 'broke'?"
—*Judge.*

Details of the New Winton Cars.

ACCESSIBILITY is the keynote of the vertical four-cylinder motors that so prominently differentiate the four models for 1905 from all previous models of the Winton Motor Carriage Company of Cleveland. The four new models are alike in their general features, which were outlined in the November 12 issue of THE AUTOMOBILE.

The engine is designed so that the crankshaft, connecting rods and pistons can be detached, taken out and returned without getting under the car or separating the cylinders from the crankcase. The aluminum crankcase is split vertically, one side being easily detachable. On this side are two openings, through either of which inspection may be made by turning a hand screw and lifting the cover. If it is desired to remove the working parts of the motor, the entire side of the crankcase may be detached by removing the bolts that hold it in place. To emphasize the fact that it is never necessary to get beneath the motor for any purpose, the dust pan below the engine is a permanent fixture and cannot be removed. The forward end of the crankcase encloses the cam-shaft gears, pump gear and magneto idler, permitting liberal lubrication and excluding dirt.

Crankshaft, connecting rods and valves are drop forged. Crankshaft and crankpin bearings are of ample length to minimize wear. The crank bushings are split to provide for adjustment to take up wear. The inlet valve chambers are cast in pairs and are bolted to the cylinders, the joints being packed with copper-asbestos gaskets. The inlet valve caps can be unscrewed by hand for inspection purposes, exposing the valves. Each pair of cylinders exhausts through one outlet, downward and then longitudinally, to an expansion chamber placed beneath the rear end of the car.

GASOLINE FEED SYSTEM.

The carbureter is placed close to the motor and is water-jacketed so that temperature variation will not affect it. Gasoline is fed by pressure from the main fuel tank under the rear of the car to an auxiliary tank, located above the carbureter, and from there is fed by gravity to the carbureter float chamber. The gasoline passes into the auxiliary tank, through a strainer which removes foreign substances. A petcock on the auxiliary tank enables the operator to draw off gasoline for cleaning purposes. Extending through the dash is a hand screw, by turning which the supply of gasoline may be instantly cut off from the carbureter.

MAGNETO IGNITION SYSTEM.

The ignition equipment consists of an alternating magneto direct connected and driven by a positive gear operating a single non-vibrating coil, from which the secondary current is returned to the magneto and distributed to the spark plugs through a mechanism integral with the magneto, of which the interrupting mechanism is also a part. Being gear driven, the magneto obviates the possibility of irregular and intermittent ignition. The location of the magneto is shown in Fig. 1. The top water connection supports fiber bushed rings, carrying the wires to the spark plugs, preventing the chance of short circuit. A spark advance lever is attached to the steering column on top of the steering wheel.

INDIVIDUAL CLUTCH CHANGE-SPEED.

The change-speed mechanism is of the individual clutch type, used on the Winton

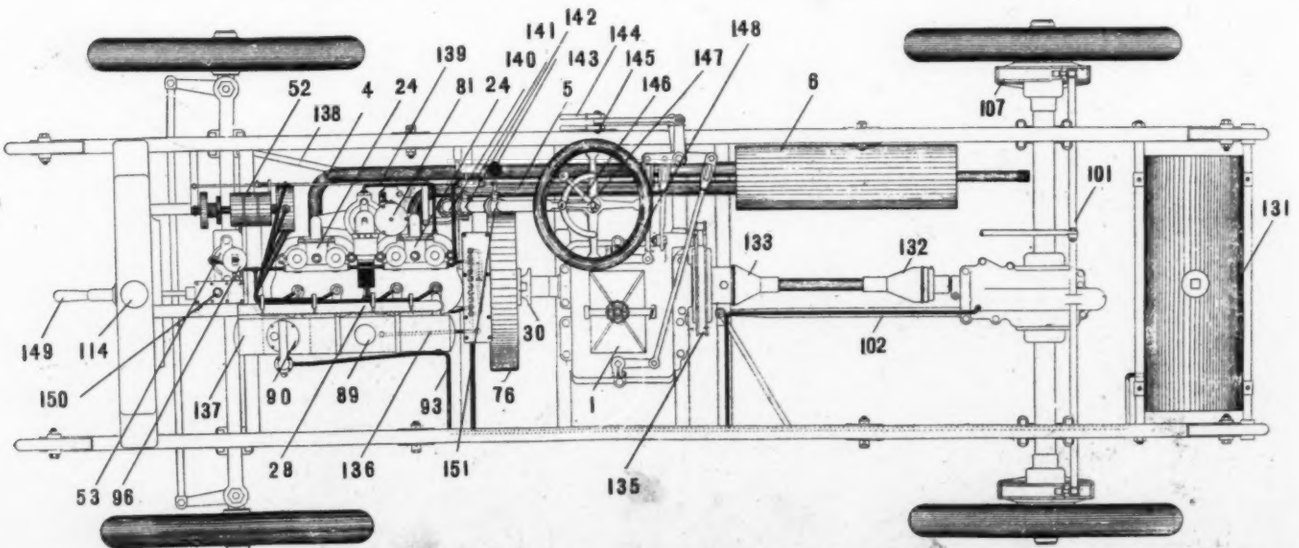
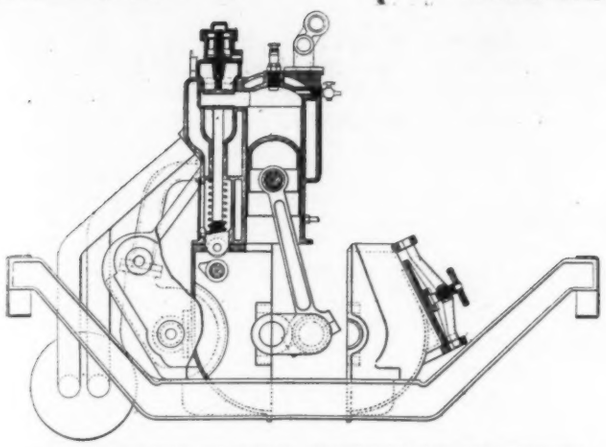
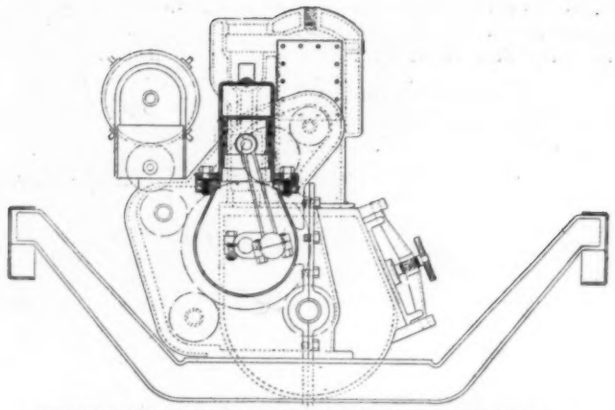


FIG. 1—PLAN DRAWING OF CHASSIS OF WINTON CAR WITH VERTICAL ENGINE, SHOWING COMPRESSED AIR GOVERNING SYSTEM.

1, Hand-hole cover of crankcase and transmission gear box. 4, 5, Exhaust pipes. 6, Expansion chamber. 24, Inlet chamber. 28, Water line from cylinder to radiator. 30. Oldham coupling. 52, Magneto. 53, Air-pump cylinder. 76, Flywheel. 81, Carbureter. 89, Oil tank cap. 90, Auxiliary gasoline tank cap. 93, Gasoline line from main tank to auxiliary tank. 96, Air line reducing valve. 101, Hub-brake cross-rod. 102, Driving strut. 107, Hub-brake shoe. 114, Radiator filler cap. 131, Gasoline tank. 132, 133, Universal joints. 135, Emergency brake shoe. 136, Oil line from tank to oiler. 137, Air line receiver. 139, Carbureter water jacket pipe. 140, Steering gear case. 141, Foot button. 142, Spark advance sleeve. 143, Foot button cap. 144, High-speed and emergency brake lever. 145, Low speed and reverse lever. 146, Air control cut-out lever. 147, Spark control lever. 148, Steering wheel. 149, Starting crank. 150, Fan oil reservoir.



FRONT ELEVATION OF MOTOR PARTLY IN SECTION, SHOWING METHOD OF REMOVING PORTION OF CRANKCASE.



FRONT ELEVATION OF MOTOR AND SECTION THROUGH THE AIR-PUMP CYLINDER.

cars for a number of years. It gives two speeds forward and reverse. Between the motor and transmission is a flexible coupling which accommodates itself to abnormal road conditions without straining the mechanism. The universal joints on the direct shafts are all enclosed. The transmission box which is made of aluminum and split horizontally, is located immediately beneath the front foot-board. The cover which fits dust and oil tight, can be removed instantly for inspection and adjustment. By removing the upper half of the case, which is bolted to the lower half, the entire change-speed gearing can be removed.

Roller-Feed Lubricator.

A lubricator with roller, driven by worm gears, is attached to the motor and extends through the dash. From a reservoir above the cylinders, lubricating oil is fed by gravity to the lubricator, being received in a float chamber, whereby a constant level is maintained, and the oil flow is stopped when the motor is not running. The oil passes from this chamber into the main chamber of the lubricator, where a gear driven aluminum roller revolves in it. The viscosity of the oil being variable with the temperature, the thickness of the oil film on the roller would increase as the temperature decreases, resulting in an excess of oil in a low temperature. To provide against this, an adjustable metallic scraper carries off the superfluous oil, limiting the thickness of the film to the distance between the scraper and the roller. Passing this scraper, the oil film engages a second scraper in contact with the roller, by which it is directed in equal quantities to ten oil leads extending to all bearings of the motor and the rear axle. All oil that works out of the external motor and transmission bearings is returned back to the case. Drains are placed at the bottom of the crankcase and the transmission box for removing oil. They also permit of flushing the cases with kerosene or gasoline.

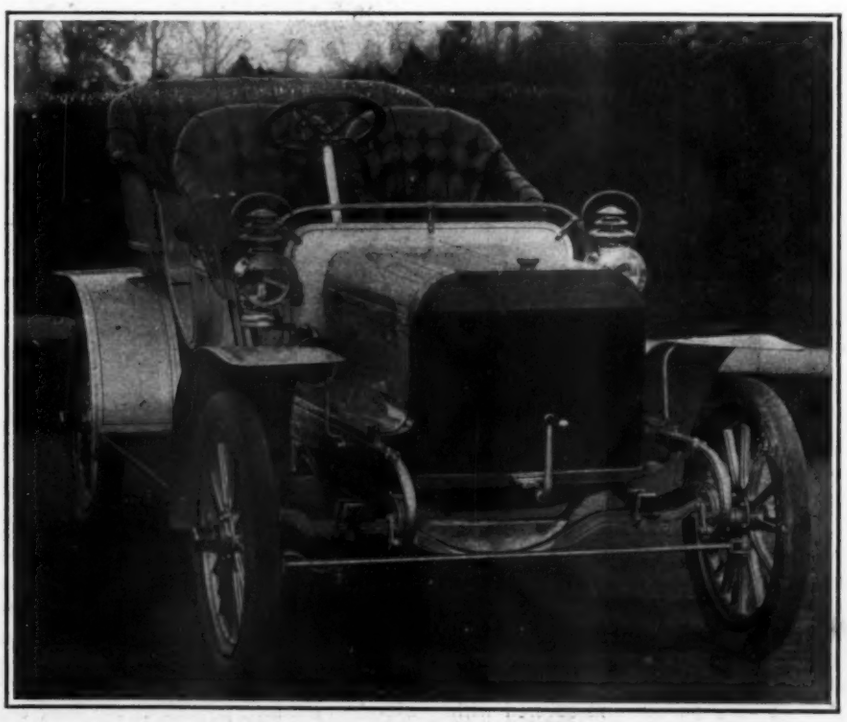
This system of lubrication provides an oil feed in direct proportion to the motor speed, assures a uniform feed in any temperature with light or heavy oil, has no springs or valves, and operates without pressure. As the oil reservoir and lubricator are both attached directly to the motor, the oil is kept warm and fluidity is assured in any temperature.

The Forced Cooling System.

The centrifugal water circulating pump is gear driven. Water is admitted to the radiator at the top and flows downward through a sieve distributor into eighty-nine copper tubes, each seventeen inches long, with 13-16 inch square radiating fins, spaced 3-16 inch apart. The sieve distributor prevents the water from passing through any series of tubes in preference to all. From the bottom of the radiator, the water flows to the circulating pump, which is at the lowest point in the cooling system. The pump forces the water upward around the cylinders, the carbureter and the exhaust valve chambers into the upper water connection, which directs it back to the top of the radiator. Back of the radiator is a gear driven fan surrounded by a casing. The passage of the air is further aided by a secondary fan cast in the flywheel. From the instant the motor starts, the circulation of water and suction of air are positive.

Air Governor Retained.

The air governor used heretofore has been retained and improved. The throttle is actuated automatically by air pressure produced by a gear-driven pump which forces air against plungers on the inlet valves and keeps these valves seated; consequently the valves cannot open to supply mixture to the cylinders unless the pressure is relieved. There are two means for relief —a hand lever above the steering wheel and a button under the driver's right foot. By the use of either lever or button the air is released in a constant or variable volume as desired, so that the inlet valves split accordingly. The operator may relieve the pressure by minute degrees from the en-



FRONT VIEW OF NEW WINTON MODEL C TOURING CAR WITH VERTICAL ENGINE.

tirely closed point to a point no greater than non-compressed air, so that the motor is governed with extreme flexibility.

CONTROL MECHANISM.

Two levers and one pedal control all transmission clutches and brakes, and it is asserted that the high-speed clutch may be used 95 per cent. of the time, carrying the speed by means of the air governor. The brake band on the drive shaft is operated on forward movement of the high-speed lever; two band brakes on the driving wheel hubs are operated by a pedal.

The front wheels and rear axle turn on roller bearings. The rear wheels are keyed to the live axle and held by nuts. The rear pinion shaft is hardened and revolves in a bronze bushing. In Model C, the axle case is split horizontally and held together by bolts. The other models have vertically split axle cases. The spindles and wheel hubs are tapered to facilitate removal of the wheels. A single ball joint strut limits the axle movement and absorbs braking and driving strains.

PRESSED STEEL FRAME.

The frame is of channel section pressed steel. No sub-frame is used, the motor and transmission being carried on malleable drop frames. The depth of frame varies from 1 3-4 inches to 5 inches. At the forward, end, the radiator casting serves as a frame spreader and also as a bearing for the starting crank. Between the rear spring hangers two cross tubes stiffen the frame and support the fifteen gallon gasoline reservoir. The only other tank is one of three compartments placed above the engine cylinders. The first chamber acts as a reservoir for the compressed air, the middle chamber contains the auxiliary gasoline supply, and the rear compartment holds lubricating oil. Horns at either end of the frame receive the ends of semi-elliptical springs. A new compensating spring has been introduced. It consists of six leaves so shackled that only three leaves are engaged under light load, while six leaves are brought into engagement when the load increases.

The steering gear is of the screw and nut type, and wear is distributed on all threads equally. Spark and throttle levers are placed above the steering wheel.

The starting crank is not detachable but is shifted into engagement through a spiral slotted sleeve and out of engagement by a helical spring. When out of engagement it is held in a vertical position. The drop front axle is of Lemoine type, forward steer.

BODIES OF SIDE ENTRANCE TYPE.

In all models but the "A Special," the body is of the side entrance type, with doors on either side. Each has seating capacity for five passengers. The front seat is divided. Cast aluminum body panels support the laminated wood seats. The seats are thickly padded and covered with hand buffed leather over four-inch cushion springs. There are pockets on the side doors, and roomy lockers beneath the front and rear seats for touring paraphernalia. The "A Special" model has a limousine body with side entrance.

Pipe Closed-Body Car.

Automobiles for winter use are increasing in popularity, largely on account of the great advances made in the reliability and smooth running of motors and the comforts and conveniences in body construction. One of the latest importations in this line is a 15-20-horsepower Pipe car, brought from Belgium by Joseph S. Heller, the American representative of the Pipe concern.

The car is fitted up especially with a view to its use in bad weather, both motor and passengers being well protected. As the accompanying illustration shows, the body is enclosed and provided with two side doors. Accommodations for four passengers are provided, and there is a surprising amount of space, which makes it possible for the occupants to be comfortable on long rides. The front seats of the coupé are hinged and fitted with springs, so that when a passenger rises to leave the car the seat automatically folds against the partition, leaving a clear passage through the door. The rear seats are of the usual fixed style.

Polished wood flaps swing out from each side and meet in the middle between the seats, forming a table extending entirely across the interior. An electric light in the ceiling is supplied with current from an independent storage battery. Communication with the driver is by means of a speaking tube which ends in a diminutive megaphone arrangement over the head of the chauffeur, who does not have to pick up the loose end of a tube to receive instructions. Each car is provided with a patent foot warmer, large enough to keep the interior warm in cold weather. A small trunk, tools, and supplies may be carried in the ample storage spaces under the rear seat and beneath the floor of the body, both being reached through doors in the rear of the car.

The motor is of moderate power, but ample for the work the car is intended to do, and runs with remarkably little vibration. Even when the car is standing with the motor running, only a slight tremor can be felt. The heads and water-jackets are cast integral with the cylinders, which have a bore of 140 millimeters and stroke of 192 millimeters. Lubrication is effected by means of an oil pump operated by belt from the secondary shaft. Sliding-gears are used in the transmission, giving four forward speeds and one reverse with a single lever. Ignition and throttle are controlled by levers on top of the steering wheel, and the usual pedals operate the brake, clutch and accelerator. The clutch is faced with leather and the facing is backed by springs, so that the car can be started with extreme smoothness and entirely without jerking.

The frame is of pressed steel. Semi-elliptic springs are fitted all round, and are easy in action. Axles, knuckles and steering gear are of the latest Lemoine make, and are solid and substantial. The wheels are of wood, 105 by 915 millimeters, and the rear tires are provided with anti-skidding bands, set with metal studs. The wheelbase is 108 inches and the tread standard. In touring trim, the car weighs 2,500 pounds. Dark blue and black are used for the exterior finish, with red striping and polished mahogany window frames to give a certain relief and lightness to the coloring. A sheet metal pan completely protects the motor underneath, so that its operation will be unaffected by mud, water or snow.

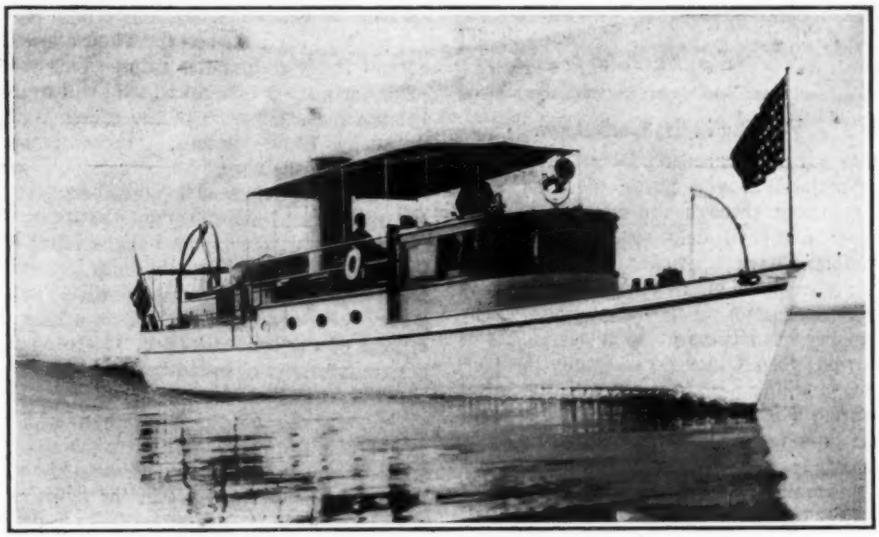
BELGIAN PIPE 15-20-HORSEPOWER CAR WITH CLOSED BODY FOR BAD WEATHER.

Motor Yacht "Hurrion."

The new power boat *Hurrion*, recently completed by the Electric Launch Company, of Bayonne, N. J., for Raymond Hoagland, Esq., of Red Bank, N. J., is a notable example of the application of modern gas and electrical engineering to marine work, the gas engine, dynamo and storage battery being used in combination.

The main source of power is a pair of F.I.A.T. automobile engines especially imported by Hollander & Tangeman. These engines are of 90 horsepower each, fitted to run on either gasoline or kerosene, and arranged in tandem with a connection by means of a heavy belt and idler, so that one or both may be used at will. They drive a dynamo, connected with a storage battery under the cabin floor, where the weight serves as ballast. The electric equipment of the engine room is very complete. The dynamo and battery may be used to start the engines, and the battery furnishes power for an electric fan, an electric pump, an electric air compressor, a searchlight, a full outfit of electric cooking utensils, and incandescent lamps throughout the yacht.

A false stack is used for ventilating purposes, all vapors being drawn from the engine room, galley and bilges by the electric fan blower and discharged through the stack. The electric compressor supplies air for the whistle and also for pressure on the water tanks which supply the lavatories.



RAYMOND HOAGLAND'S YACHT "HURRION," FITTED WITH TWO 90-H.P. AUTO ENGINES.

The yacht, which was designed by the builders, is 80 feet over all, 11 feet in breadth, and draws 3 feet. She has a sunken pilot house with bridge deck, and the owner's quarters, including main saloon, private stateroom and bath, are aft. The galley is fitted with electric stove, boiler, urn, chafing-dish, one oven and plate-warmers. The tanks carry 700 gallons of fuel, gasoline being used in the trial. New carbureters for kerosene will be fitted before the yacht is placed in commission next spring. The power tender is fitted with a 5-horsepower Peugeot automobile motor.

The Automobile Club of France has finally decided on the Arcachon Basin as the course for British International Cup contest of 1905; the first race being on September 11. The entry fee is 500 francs, half of which will be returned to every *bona fide* starter. The defending boats, three in number, will be selected by means of elementary trials.

PEERLESS 1905 SIDE-ENTRANCE TOURING CAR FITTED WITH 50-H.P. MOTOR.

The engraving herewith shows the new 50-horsepower Peerless touring car, with side entrance, for the season of 1905. The construction follows the general practice of the Peerless company, and the motor is said to be practically a copy of the engine in the *Green Dragon*, which now holds world's track records for heavy-weight cars up to fifty miles. At the wheel of the car is A. E. Morrison, Boston agent for the company, and a successful competitor in track and road contests; seated at his side is L. H. Kittredge, general sales manager for the Peerless Motor Car Company in Cleveland; and in the rear seat are L. P. Mooers, engineer and superintendent of the factory, and E. H. Parkhurst, advertising manager.

Correspondence

Popping in the Carbureter.

Editor THE AUTOMOBILE:—

[125].—Will you please give me some suggestions through the columns of your paper that will help me to remedy the troubles I have experienced in the operation of my machine, viz.: Loss of power, pop in carbureter and missing explosions.. The popping commences as soon as the car is started; then I may go one mile, the popping continuing, and the car will stop; after waiting a few minutes, I crank her and off she goes again.. This performance may be repeated in the next mile, or perhaps not for ten miles. I have had the valves cleaned twice, carbureter adjusted and cleaned; have put in new batteries, new commutator spring, new spark plugs, and have had the coil adjusted, but all without avail. Any assistance will be appreciated.

W. G. H. R.

New York City.

Back-firing is usually due either to too poor a mixture, which continues to burn all through the exhaust stroke and ignites the fresh charge, or to failure of the inlet valve to seat properly. The only way in which ignition trouble could cause it would be by the charge failing to ignite at the proper time, and then being ignited so late in the stroke that it could not wholly burn in the time remaining. A thorough search along the above lines ought to disclose the cause of trouble. It may be, for example, that your carbureter float sticks and fails to close the valve; or something might be loose about the spark timer; or the combination of a broken wire and retarded spark would do the trick. If your compression is very weak it might have something to do with it.

Counter-Balancing Two-Cylinder Engine.

Editor THE AUTOMOBILE:—

[126].—What is the proper method of counter-balancing a two-cylinder, vertical engine? Of course, I am aware of the fact that a two-cylinder engine can not be perfectly counter-balanced where both crank-pins are on the same side of the shaft, but wish to know how much counter-balance in excess of the actual weight of the cranks and connecting rod will give the minimum amount of vibration.

Please also give me the reason for not placing the cranks on the two-cylinder engine opposite each other except for irregular exhaust? This will, of course, more perfectly balance the engine, and would not, I should think, decrease its power to any appreciable extent.

G. C. B.

Logansport, Ind.

With the cranks together, you are hardly likely to find a better balance than that given by counterweight enough to put the shaft in balance when the two connecting rods are put on the cranks and the whole allowed to roll freely on parallel strips. This will leave the pistons unbalanced, and will overbalance the small ends of the rods. With unusually heavy pistons, more counterweight could be used.

The most satisfactory balance for a given car will depend somewhat on the location and position of the motor. If the latter is vertical and in front, with the shaft fore and aft, it may be safe to overbalance the pistons a very little, getting to that extent a lateral instead of vertical vibration. If the shaft lies transversely, it would be practicable to add weight enough, if there is room for it, to balance the pistons altogether, which would result in fore and aft shaking at midstroke. The counterweights should be on the cranks themselves, not in the flywheel.

The objection to opposite cranks is not so much the irregular exhaust as it is the irregular torque, with its accompanying irregular rocking of the engine in reaction from the explosive impulses. For a high speed motor this arrangement would usually be less objectionable than the other, but it is not often preferred for medium or slow speeds. It is precisely because no perfect or nearly perfect balance is possible with the two-cylinder vertical motor, without recourse to trappy or "freak" construction, that it is now so seldom found.

Oiling the Crank-Pins.

Editor THE AUTOMOBILE:—

[127].—I was much interested in the device used by Smith & Mabley to ensure lubrication of the crankpins in their Simplex car, as described in your issue of December 10, because I used practically the same device some six years ago in an experimental engine, and have used it and suggested its use in several engines since, always with perfect success. To lubricate the crank-pins of a high-speed motor I know of no device so effective.

My own method is to cut a good-sized piece out of the bottom brass, and introduce a piece of coarse felt to hold the oil; but this may or may not be an improvement. I leave the top brass, on which the working pressure comes, perfectly plain. Any break in it, even an oil hole, is a mistake, and reduces the effective area of the bearing by much more than its own size. The reason for this is that the oil film in the bearing is under pressure, which it resists by its own cohesion, and this pressure is at a maximum at the center of the bearing and falls away to nothing at the ends. If the bearing surface is broken by a hole or groove, the oil squeezes into this hole or groove when pressure is applied; and, of course, the pressure thereabouts is below the maximum for a greater or less distance. When oil is supplied freely to the center of a bearing on the slack side, it is carried around by its own cohesion, and works out at both ends, carrying with it any metal particles that may have worn off.

Builders of high-speed motors who attempt to oil their crankpins in the usual way, by oil holes drilled through the upper half of the big ends of the rods, are apt to find that these bearings wear out abnormally fast unless made very long. I have seen crankpin bearings considerably longer than the main bearings—and that, too, in some of the finest makes of French cars—where there was no other reason for it than antiquated methods of lubrication.

HERBERT L. TOWLE.

New York.

How to Set Valves.

Editor THE AUTOMOBILE:—

[128].—I own and operate a four-cylinder gasoline car, and write to know if you can give me a good setting for the valves on a four-cylinder, 5 by 5 engine, giving the position of the inlet and exhaust valves at point of opening and closing?

Also, I have considerable difficulty in starting the engine in cold weather. The reason, I think, is that the gasoline does not vaporize properly in the carbureter. Can you not suggest some remedy which will obviate this?

A. W. P.

Wheeling, W. Va.

Assuming that you wish simply to know how to restore the correct setting after the gears have been taken apart, the exhaust valve should close when the crank has got 5 to 10 degrees past the top center, assuming the speed not to exceed the normal maximum of 1,000 or 1,200 r. p. m. The inlet valve, if mechanically opened, should begin to open when the exhaust valve closes, or a very little earlier. Without knowing more about your machine, it would be impossible to advise you as to the best time for opening the exhaust or closing the inlet valves, in case the cams should need alteration.

To start your motor in cold weather, wrap cloths wrung out in hot water around the carbureter, or try a lighter grade of gasoline. Don't let water get into the carbureter, and don't use a torch.

Who Knows the Sapphire Country?

Editor THE AUTOMOBILE:—

[129].—I should be glad to hear from some of your North Carolina subscribers as to whether the roads through the "Sapphire Country" of North Carolina are practicable for an automobile trip along the French Broad.

It is my intention to make a trip through there in the spring, stopping at various points where the fishing is good.

PISCATOR.

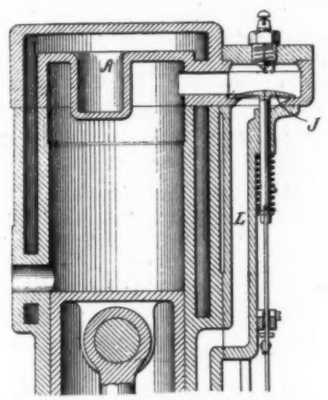
The luxuries of one generation are the necessities for the next. It is not impossible that in a few years more the poor man of this country will ride to work in his neat $50 automobile and look with envy at his rich neighbor who is able to sail round in a $2,000 airship.—*Oshkosh (Wis.) Northwestern.*

Patents

Two-Cycle Engine.

No. 775,819—C. and W. Hibbard, of Sandyhill, N. Y.

An engine in which the fresh charge is admitted through a cam-actuated valve *J* near the top of the cylinder, and deflected downward by the water-cooled deflector *A*. The shape of the transfer passage *L* just below the valve is such as to concentrate the



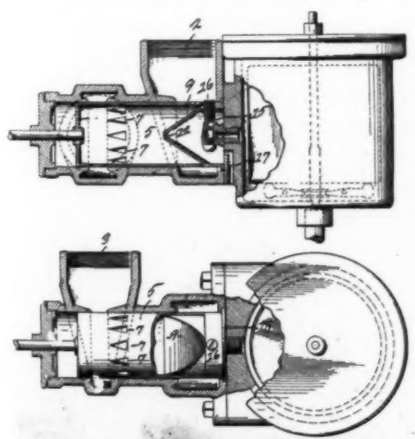
HIBBARD TWO-CYCLE ENGINE.

rush of the charge on the spark plug when the valve is opened, thus insuring positive ignition with throttled charges.

Carbureter.

No. 775,553—G. W. Burton and A. F. Seibel, of Toledo, O.

This carbureter has an air inlet variable to suit the degree of throttle opening. Both functions are controlled by the sleeve *5*, pierced with the triangular holes *7 7* leading to the induction pipe at *3*. In both views the throttle is shut, but when it is open air enters at *2* and draws between the



BURTON AND SEIBEL CARBURETER.

wedge *9* and the edge of *5*. A fixed inlet is supplied at *17*, through which air enters to mingle with the gasoline sprayed from *15* before issuing from the slit *12* at the end of the wedge. It is claimed that the spray will impinge against the upper part of the wedge and the air against the lower part. The spray may be regulated by the screw *16*.

Traction Wheel.

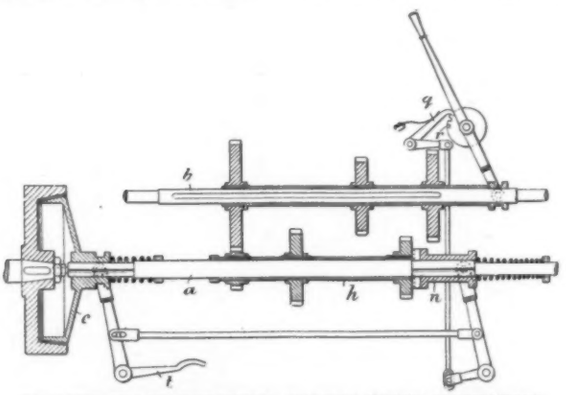
No. 774,246.—A. W. Herrick, of Buffalo, N. Y.

A wheel equipped at one side with sharpened spokes, extending from hub to tire periphery, and normally retracted clear of the ground by springs, but forced out to meet the ground by a sliding cone and levers near the hub. The ends of these spokes are supposed to grip the ground when the tires slip.

Sliding Gear Clutch.

No. 775,503—A. Soames and W. Langdon-Davies, of Surrey County, Eng.

The mechanism for reducing the shocks incident to shifting gears, by disengaging the driving gears from their shaft as well as the shaft from the flywheel, so that these gears do not have to modify the inertia of the driven member of the clutch when shifted. In the drawing, *a* is the clutch shaft, *b* the driven shaft, *c* the clutch



ENGLISH SHOCK REDUCING CHANGE-SPEED MECHANISM.

cone, and *t* the clutch pedal. The three driving gears are fixed to a loose sleeve *h*, which may be locked to the shaft by a positive jaw clutch *n*. The latter is connected to the flywheel clutch and also to the locking mechanism *q r* in such a way that the first depression of *t* releases the cone clutch, a further depression releases the jaw clutch, and at the end of the depression the locking mechanism is released to permit a shift of gears. As *h* is much lighter than *a* plus *c*, the shock of meshing is correspondingly less, and *c* is accelerated or retarded by *n*.

Folding Goggles with Shield.

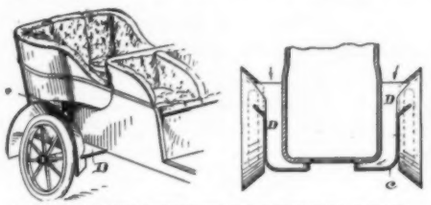
No. 775,381—H. Newbold, of London, Eng.

A pair of folding goggles with flat glasses and a spring frame supporting a silk shield; the glasses fold against each other.

Radiating Means for Cylinders.

No. 775,860—J. H. Sager and G. D. Green, of Rochester, N. Y.

A system of slotted tubes used in place of the usual flanges or pins. The slotted edges *c* of the tubes are turned inward, increasing the edge surface, from which the heat is believed to pass more readily to the air. The bases of the tubes are flanged outward, and a perforated sheet *A* is slipped over the tubes till it engages the



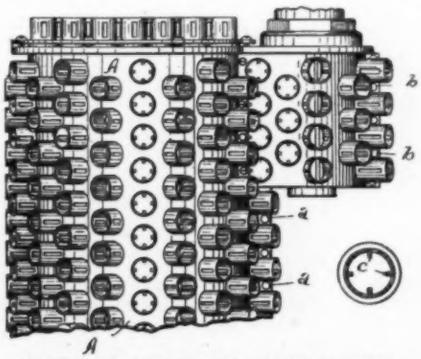
BROWN ATTACHMENT TO DEFLECT DUST.

flanges. Screws *a a b b* then clamp sleeve and flanges tightly in place, and similar means may be used on the cylinder head.

Dust Deflector.

No. 775,595—W. H. Brown, of Chicago.

A flaring mudguard combined with an apron *c* under the overhang of the tonneau seats. This apron forms, with the floor *D*, also provided, an air passage which is carried around to the rear as shown in the sectional plan. The air thus discharged fills the partial vacuum created at this point by the motion of the car and prevents the dust from being sucked upward into it.



SAGER AND GREEN AIR-COOLING DEVICE.

The Russian Minister of Ways of Communication has approved requests for the purchase of a number of automobiles for use in the transportation of freight between the various railway stations in St. Petersburg.

THE AUTOMOBILE

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Closed Cars for City Work.

The advent of snow and cold weather in New York has served to bring into prominent notice a change that has been taking place for some time in the general adoption of closed automobiles. Three years ago the closed body, except in the case of the electric cabs, was a rarity, and the open car was accepted as a matter of course. Since then many fine specimens of closed body work have been seen at the shows and in the importers' warerooms, and this year a number of large and costly closed cars of both American and foreign make have been in regular use about New York and on Long Island.

For some weeks past, at a season which is frequently only the ending of a tardy Indian summer, the weather has been such as to make an open car decidedly uncomfortable as a pleasure vehicle, but in place of the usual result of a diminution of the number of automobiles seen, if anything, they have been more numerous in the streets than ever. One can hardly pass through the shopping district and the upper part of the city without noticing the very large proportion of enclosed automobiles, the majority of which are not the large, high-powered cars with cumbrous bodies such as are now built for touring, but are of comparatively low power, and intended for city and boulevard use. One distinct type is the imported landaulet with motor of 8 to 15-horsepower now used by women for calling and shopping.

This new type of car appeals to many who have no especial partiality for the automobile, as well as to those whose enthusiasm is not equal to the test of an open tonneau in December. The former find in it a comfortable and practicable substitute for the horse, free at once from the dirt, danger and the stigma of Red-Devilism which in their minds attach to the huge touring car. Such a car saves the horses in stormy weather and on slippery streets, is ready for service at all hours and never tires nor falls ill; it is at least equal in every way to the horse in convenience and efficiency. Where it is a question of protection from the weather for women or elderly men, or for protection to the toilette in calling or attending the theatre or opera, the closed car of light power appeals to an entirely new *clientele* in motoring. Even the seasoned automobilist, who at one time would have scorned the idea of protection, has awakened to the comfort, convenience and safety of the closed car of moderate power for winter work in the city.

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Investigation of the Gas Turbine.

The very suggestive résumé, on another page, of a paper read by Mr. R. M. Neilson before the last meeting of the Institution of Mechanical Engineers is of interest not only to the technical man, but to the layman as well. If it had no other merit, Mr. Neilson's paper at least indicates—inferentially, to be sure, but none the less truly—some of the more important problems yet to be solved before a working gas turbine can yet be offered to the public. Incidentally, the futility of attempting to displace the reciprocating gas engine by any form of "rotary" gas engine will be strongly impressed on the mind of every one who reads that article intelligently.

A purely theoretical investigation like the one referred to is more than valuable, it is essential to a correct start on so highly technical a subject as the development of the gas turbine. Without such a preparation, the inventor would almost unavoidably start on what seemed at the time the path of least resistance, and, while producing a working turbine, would miss altogether, unless by happy accident, anything resembling a final type. Before long he would be distanced by his better trained competitors, and would have to abandon all that he had worked for and start afresh. The only complaint that can be brought against the theoretical starting point is that, as the article itself points out, the data are so incomplete. For this reason, too implicit a reliance on the results of calculation should be avoided, and close attention paid to the yet unexplored modifying factors of heat transmission, velocity of nozzle discharge, compressor efficiencies, etc.

Though the scope of Mr. Neilson's paper evidently did not include such concrete matters as weight per horsepower and adaptability to road transportation, it cannot be questioned that the gas turbine, when perfected, will have advantages over the reciprocating gas engine as great as those enjoyed in its own field by the steam turbine. The one serious objection—the enormously high shaft speed necessary with jet turbines—seems to have been overcome with a fair degree of success in the De Laval turbine by the use of very wide herringbone gears for the first reduction. This, of course, is not the problem troubling inventors most, but it is yet too soon to say how far the difficulties now encountered in gas compression, burning and useful expansion are inherent in the nature of the turbine. As we understand the problem better, it seems safe to say that most of them will disappear.

Against these considerations we may set such positive advantages as light weight per horsepower, great mechanical simplicity as compared with the reciprocating engine, absence of vibration and ease of lubrication—not the least important point, this, of the turbine's practical advantages. All these, be it noted, are in addition to the high thermodynamic efficiency which, to the scientist, is the prime recommendation of the turbine.

It seems not impossible that we may look to the gas turbine for the final solution of the problem of utilizing the heavy hydrocarbons which now go begging for a market because we have as yet learned only to use gasoline—barely kerosene—in our internal combustion engines. Heavy oil, surrounded by the high temperatures of a turbine nozzle or combustion chamber, would burn with far less residuum than in an engine cylinder, and the constantly-burning flame would at a stroke cut the knot of the ignition problem. It may be noted also, as an incidental but important point of superiority over the reciprocating engine, that the turbine motor would give maximum torque at minimum rotative speed, the contrary being one of the chief objections to the present type.

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An Opportunity Not Improved.

There was promise of something interesting in itself, and of ultimate benefit to all parties, in the invitation of the Automobile Club of America to one of the city magistrates of New York to address the club from the magisterial standpoint, and it is to be regretted that this first attempt in a new line failed of a realization of its possibilities.

Assuming that the club desired to measure the full force and justice of the prevailing popular opposition to the automobile, the selection of a magistrate as the mouthpiece of such opinion was a wise one. While necessarily in possession of much valuable evidence on both sides, the bench is supposed to represent calm, deliberate opinion, far removed from mere popular clamor, and to base its decisions only on the broadest possible view of the subject under consideration. From the individual standpoint, the

selection was an excellent one, as no one would for a moment consider the speaker as in any way prejudiced toward the automobile.

The opportunity thus offered to the opposition to place a strong case before a representative audience of motorists was an exceptional one; and it is most unfortunate that the speaker failed to appreciate it, and to rise above the hackneyed commonplaces and fallacies of the average autophobe. The theories that the laws are made by the poor people of New York, who must be placated in some way by the automobilist—of necessity a millionaire—; that the automobilist is distinctively a law-breaker in contrast to all other users of the highways, and that he should be subjected to exceptionally severe penalties as compared to the drivers of horse-vehicles, are hardly calculated to solve the one point at issue—the rights and responsibilities of all users of the public highway, and, incidentally, they are hardly calculated to reassure any unfortunate automobilist who may chance to meet the speaker under less auspicious circumstances. Though the phrases were modulated to the rather exceptional nature of the audience, the general tenor of the address was not such as to bring together the public and the automobilists on a common ground of reciprocal relations and mutual benefit, and the discussion tended to bring out only the other side. It was pointed out that the New York automobilist is subject to four separate and conflicting laws, each with a final clause repealing all inconsistent provisions in other acts; so that even with the best intentions, the most cautious of drivers may be at a loss as to the proper legal course.

It has been pointed out repeatedly in this paper that the automobile is in no way the sole cause of danger in the streets, and that it is only a detail of that universal public demand for higher speeds which dates back to the displacement of the horse-car by the first slowly moving electric street cars. There has been a rapid increase in the speed of the whole body of street traffic, this increase being evident even before the advent of the automobile. As a result, new and difficult problems have arisen, the successful solution of which rests with those who make and administer the laws as well as with those subject to them. At the present time it may fairly be said that the automobile clubs, not only in this country but abroad, are doing their part and in no way avoiding their responsibilities.

An English motorphobe, F. W. Verney of the Bucks Chamber of Agriculture, has proposed an ingenious form of punishment for automobilists convicted of fast driving. He would have the offending cars painted yellow and marked with the governmental Broad Arrow.

The Automobile Club of Argentine, recently formed at Buenos Ayres, according to latest reports, has enrolled more than 100 members.

MAGISTRATE CRANE ADDRESSES MOTORISTS.

Gives Characteristic Advice to A. C. A. Members at Weekly Meeting Upon Invitation.—Ex-Presidents Scarritt and Shattuck Call Attention to Inconsistent Laws and Police Discrimination.

Magistrate Crane, famous among New York automobilists for his severity in dealing with those who come before him in his official capacity, was the guest of honor of the Automobile Club of America on Tuesday evening, December 13, having been invited to address the members on the subject of their relations with the law.

The magistrate took his usual stand and insisted that automobilists must obey the laws of the people or be "swept from the highways." Automobilists as a class, he said, are regarded as hard-hearted, unfeeling men, who consider it a huge joke to see a pedestrian jump for his life from in front of a car.

Ex-President Winthrop E. Scarritt replied to the magistrate's remarks, and brought out strongly the point that automobilists were not only willing, but anxious to obey the law, but that they should have a law that could be obeyed. The results of the timing of horse-drawn vehicles and automobiles last summer in Central Park were alluded to, and emphasis was laid on the fact that although many automobilists were arrested while the timing was in progress, not one horse driver was molested, showing that there was discrimination.

Magistrate Crane replied that horse drivers brought before him fared exactly the same as any one else, and declared that automobiles were dangerous because of their tremendous power. He became quite animated in describing several of his narrow escapes, when his jump, that has been often referred to before, was brought into play.

Several other speakers followed with pertinent statements of the facts as they found them. A strong point brought out by A. R. Shattuck was the confused condition of the New York State laws relating to the operation of automobiles. There are four measures, Mr. Shattuck said, and as each was enacted a clause was added repealing conflicting provisions in other laws. Consequently, all the laws must be considered at the same time, and the task was beyond the powers of even the proverbial Philadelphia lawyer. The speaker frankly admitted that he and all other automobilists found it practically impossible to keep within legal speed limits.

Magistrate Crane, while keeping somewhat wide of the main issues, won the unanimous approval of all his hearers by declaring that no man addicted to the use of intoxicants should be permitted to handle an automobile. Mr. Shattuck went a step further and said that no such person should be allowed to drive any kind of vehicle. Several other members spoke in the same vein, and though it was evident that the magistrate and the automobilists did not see matters in the same light, the best of feeling prevailed, even after the guest of the evening stated that his little daughter, on being told that her father was going to address the Automobile Club, exclaimed, "Give it to them, Papa!"

The meeting was the regular Tuesday evening open gathering of club members and their friends. President Morris presided. After the more serious part of the entertainment was concluded the grill-room was invaded and the guests partook of refreshments.

Following is a list of the committees appointed by the Board of Governors of the Automobile Club of America at their meeting on December 7 at the club headquarters in New York. The chairman, when the only member named, will fill the vacancies in his committee:

House Committee—Captain Homer W. Hedge, chairman; General George Moore Smith, Robert Walton Goelet, W. H. Browning and J. V. Black.

Law Committee—Winthrop E. Scarritt, chairman; W. W. Niles and another to be chosen.

Committee on Membership—Emerson Brooks, chairman; Clifford V. Brokaw and John V. Trevor.

Racing Committee—George I. Scott, chairman; William K. Vanderbilt, Jr,, and D. H. Morris.

Library Committee—A. R. Shattuck, chairman, and Philip T. Dodge.

Good Roads Committee—A. R. Shattuck, chairman; William Rockefeller, J. F. Plummer, Jr., and M. D. Chapman.

Runs and Tours Committee—M. M. Belding, Jr., chairman.

Foreign Relations Committee—Clarence Gray Dinsmore, chairman.

Exhibition Committee—General George Moore Smith, chairman.

Motor Boat Committee—J. H. Carpenter, chairman; Frank Croker, P. Chauncey Anderson and C. V. Brokaw.

Technical Committee—Dr. Schuyler Skaats Wheeler, chairman.

GORDON BENNETT ENTRIES.

Two Pope-Toledos and a Locomobile to Represent America.

Only three entries for places on the Gordon Bennett team have been received by Secretary Butler, of the Automobile Club of America, notwithstanding all that has been heard about fast cars under construction in this country for some time past. These are Colonel Albert A. Pope's 90-horsepower Pope-Toledo racer; a similar Pope-Toledo racing car that has just been ordered by W. T. Muir, of Lexington, Ky., and the Locomobile car, the entry of which by Dr. H. F. Thomas, of Chicago, has already been noted. "If none of these cars fall down," said Secretary Butler, "we shall have a team. I don't know why the others who have fast cars have not come in; several other entries were expected, but have not materialized." The entry lists closed Thursday, December 15.

A day or two before the closing of the list a New York man, Andrew Dam, made inquiries at the club rooms on behalf of one Treene, a Michigan man said to be connected with the Corliss steam engine company, who has under construction a special racing car with a motor capable of developing 120-horsepower. Assurances were given that the entry would be made, probably through a member of the club, but up to Thursday evening, however, nothing further had been heard of the Treene wonder.

When in danger of being run down by an automobile, says the Rankin, Ill., *Independent*, a Milwaukee man leaped into the air, alighting on the machine and thereby saving his life which is remindful of the fact that it was the hops that made Milwaukee famous.

"I see that King Edward is traveling incog."

"Something new in automobiles, I suppose." —*Judge.*

SENATE COMMITTEE FAVORS ROAD BILL.

Strongly Recommends Latimer Bill Appropriating $24,000,000 for Highway Construction—Says Congress Has the Power, and Public Would Save Losses of $500,000,000 Yearly.

Special Correspondence.

WASHINGTON, D. C., Dec. 12.—In a long but highly interesting report, the Senate committee on agriculture and forestry has strongly recommended the passage of the Latimer bill for the improvement of public roads. It carries an appropriation of $24,000,000, to be available in three annual instalments of $8,000,000. This fund is to be used in the construction and improvement of the public roads of the country, under the direction of the Secretary of Agriculture through a bureau of highways.

The following excerpts from the report will be of interest to all who want to see the public roads of the country improved:

"The first point of inquiry is as to the constitutional power of the Congress to make an appropriation for road purposes. The broad construction that has been given to the 'commerce clause' of the constitution by the enactment of river and harbor legislation, would seem to leave little doubt of the power of Congress to make an appropriation for the construction and improvement of the roads if such appropriation was thought desirable. In other words, an examination of the course of legislation under that clause will demonstrate the fact that both upon principle and logic, the power to improve roads is as clear as the power to improve non-navigable waters of the country, and that the whole question is not so much one of power as expediency."

After discussing at length the power of Congress in this respect, and pointing out numerous instances in which that power had been invoked, the report goes on to say:

"Under the system of road building and improvement now in vogue in most of the states, about one-third of the people are called upon to do all the road work—the people who live on the road. They are required to work so many days on the road each year or to pay so much in lieu of their labor. The work done in this way is scarcely sufficient to keep the roads in passable condition, much less to build permanent highways. Some of the states levy a road tax, and because of their great wealth have been able to do something toward the building of permanent high-class roads. The real difficulty lies in the fact that under either method a large part of the population and wealth escape taxation for road duty altogether.

"The plan of the bill under consideration is to relieve this difficulty by appropriating one-half of the cost of improving the roads out of the national treasury. The improvement of the roads is a gigantic undertaking, and in that fact lies the first and most urgent reason for national aid. Because it is a gigantic enterprise does not argue that it ought not to be undertaken, provided the plan proposed is within the means of the government and in line with its duty.

"It will not be contended that the roads should be allowed to remain as they are. They must be brought up to the proper standard by some means, and money is that means. The money must come from the people, and it should be drawn equally from all. The only way to accomplish that, is by an appropriation from the general treasury. The average cost of transporting products over the public roads in the United States has been found, after careful investigation, to be 25 cents per ton per mile, and the total cost per year about $1,000,000,000. Over improved roads the cost is from 10 to 12 cents per ton per mile, so that under a system of high-class roads the people would save, in the bare cost of transportation alone, about $500,000,000 per year.

"The roads of the country are the avenues of the prosperity of the whole country and are to a large body of the people the connecting link between them and civilization. They are of vital importance. Their present condition should be a source of mortification to the nation. Their improvement will make for the upbuilding and uplifting of all the people in every department of life, and the passage of this bill would be entirely consistent with our constitutional power and in line with our public policy."

Every automobile owner and user in the country should be an advocate of the Latimer bill, whose enactment would increase one hundredfold the pleasures of automobiling.

GOOD ROADS MEN MEET.

New York Supervisors' Committee to Ask $4,000,000 Appropriation.

Special Correspondence.

ALBANY, Dec. 12.—A meeting of the executive committee of the annual Good Roads Convention of delegates representing the various boards of supervisors of New York State was held at Albany on December 8, preparatory to the general meeting in the same city on January 24-25. There were present W. Pierrepont White, Utica; Albert R. Shattuck, New York; Dr. Edward J. Bedell, Albany; S. S. Salisbury, Auburn; Charles T. Chamberlain, Elmira; F. B. Parker, Batavia; Arthur Warren, Rochester; Robert E. Gilman, Syracuse; Ira P. Cribb, Canandaigua, and John Gick, Saratoga county.

The executive committee has announced that its report will ask for $4,000,000 this year, as the counties have appropriated that much money. It will also ask the Legislature to again pass the $50,000,000 bond issue to build one mile in ten of all the highways in the state, making a state system of 7,500 miles. The bond issue has been discussed widely throughout the state before boards of supervisors, highway conventions, farmers' institutes and grange meetings, and wherever it has been explained has met with the approval of the people, who want to develop roads leading to the present shipping centers.

The general meeting will bring together 350 delegates, representing fifty-seven counties of the state.

NAPIER HARMSWORTH CUP ENTRIES.

Special Correspondence.

LONDON, Dec. 3.—The Napier Motor Car Company has already entered two launches for the next match for the British International Cup for motor boats, and a third entry of a Napier launch is promised. In addition to *Napier II.* of this year, of thirteen meters length and with a four-cylinder motor of 120 horsepower, there will be *The Napier*, of very light construction unsinkable and self-righting.

The third launch, now under construction, is for Lionel de Rothschild. She will be twelve meters long, designed for heavy weather, and will carry a six-cylinder motor of 180-200 horsepower. The three launches will together be adapted to all extremes of light, moderate and heavy weather, and it is expected that one of the three will run under any conditions.

FLORIDA RACE PROGRAM.

Events Arranged for Six-Day Ormond-Daytona Tournament in January.

Entry blanks for the third annual international racing tournament to be held on the Ormond-Daytona beach, Florida, during the week of January 23, have been mailed. The entries close Tuesday, January 10, 1905, with W. J. Morgan, 136 Liberty street, New York. The list of events is as follows:

Event No. 1.—One hundred mile international race for the W. K. Vanderbilt, Jr., trophy; to be run in five courses of twenty miles each, making four turns at the ends of the straights, and in case the number of starters exceeds six, the cars to be started at one-minute intervals and the winner determined by time instead of place.

No. 2.—One-mile international championship race for the Sir Thomas R. Dewar trophy; to be run in heats of four cars each.

No. 3.—Ormond Derby ten-mile open race for the Maj. C. J. S. Miller trophy.

No. 4.—Daytona Handicap fifty-mile open for the F. E. C. A. A. Burgoyne cup.

No. 5.—One-kilometer record open race for the H. L. Bowden trophy; same conditions as to starters as in event No. 1.

No. 6.—One-mile open race for steam cars for the Col. R. C. Clowry trophy.

No. 7.—One-mile for cars up to 60-horsepower for amateur drivers only.

No. 8.—Fifty-mile handicap for the Lozier trophy, open only to American-built cars; conditions same as in Event 2.

No. 9.—Ten-miles for Mercedes cars only, for the Allen-Halle trophy.

No. 10.—Ten miles for F. I. A. T cars only, for the Hollander & Tangeman cup.

No. 11.—Twenty miles open, for the E. R. Thomas championship trophy.

No. 12.—Five-mile trials against time, open to stock cars listed at $1,000 to $1,800.

No. 13.—Five-mile trials for stock cars listed at $1,801 to $2,750.

No. 14.—Five-mile trials for stock cars listed at $2,751 to $4,000.

No. 15.—Five-mile handicap for stock cars, open only to those cars that have competed in events Nos. 3, 4 and 5.

No. 16.—Five-mile trials for stock cars listed at $4,001 to $6,000.

No. 17.—Five-mile trials for racing cars of all weights.

No. 18.—Great Ormond Handicap five-mile race open only to first five cars in events Nos. 7 and 8.

No. 19.—Five miles for gasoline cars of $650 list or less.

No. 20.—Five miles for stock cars of $651 to $1,000 list.

No. 21.—Ten miles for stock cars of $1,001 to $1,800 list.

No. 22.—Ten miles for stock cars of $1,801 to $2,750 list.

No. 23.—Ten miles for stock cars of $2,751 to $4,000 list.

No. 24.—Ten miles for cars of 40 horsepower and less.

No. 25.—One-mile trials for stock cars of 551 to 851 pounds.

No. 26.—One-mile trials for stock cars of 852 to 1,432 pounds.

No. 27.—One-mile trials for stock cars of 1,432 to 2,204 pounds.

No. 28.—Gymkhana race.

The committee in charge of arrangements for the Glidden touring competition will hold a meeting in New York city on December 21 for the purpose of arranging conditions and details of the event.

France has added another new word to the vocabulary of motoring—"domobile—signifiying the new enclosed touring cars with sleeping accommodation.

POWER BOAT EXHIBITORS.

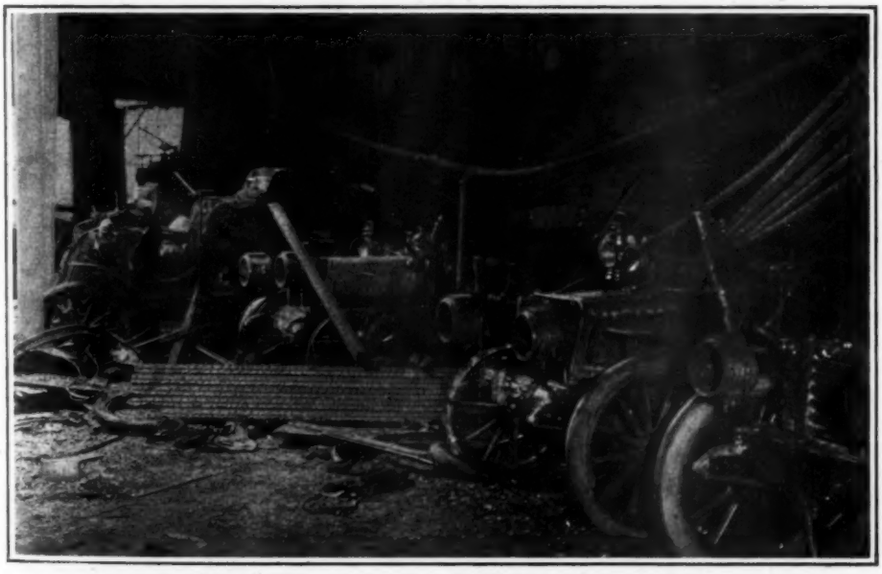
Famous Yacht Builders Engaging Space at Boston's Auto Boat Show.

Special Correspondence.

BOSTON, Dec. 12.—When the Boston Automobile Dealers' Association announced last summer that it was planning to hold a power boat show in connection with its annual automobile show in March, and that it would devote the entire basement of Mechanics Building to the boats, there were many scoffers who said that the association could not get enough boats together to make any kind of a showing in the big basement space. The committee of the association in charge persisted with the idea, however, and now, with the show three months away, the applications received for space demonstrate that Boston will have the best power boat show ever held in this country.

The famous firm of Herreshoffs, of Bristol, R. I., builders of America's cup defenders and of record-making power boats, has taken four large spaces and will have an exhibit of exceptional interest. It will exhibit a racing auto boat which is now in process of construction for a nobleman abroad, and which promises to be a revelation in aquatic speed. This boat will be shipped to its owner direct from Boston. The Herreshoffs will also show other boats and models of famous craft.

Another well-known firm of boat builders, which like the Herreshoffs, has considered its reputation well enough established not to require advertising in shows, is the Lawleys, of South Boston, builders of some of the fastest and finest craft afloat in Massachusetts waters. Murray & Tregurtha will likewise have a large exhibit, and the Fore River Ship & Engine Company, builders of warships, and the seven-masted schooner *Thomas W. Lawson,* have taken space. Every day sees the space in the power boat department lessening and this section will undoubtedly rival in interest the automobile display.



CORNER OF MAIN FLOOR, SHOWING DAMAGE TO DECAUVILLE CARS AND BUILDING.

FRENCH ELECTRIC VEHICLE TRIALS.

A reliability trial of electric vehicles will take place in Paris next May, under the auspices of *L'Auto.* The trials will cover eight days, the cars running a distance of 100 kilometers each day from the charging station in Paris. The classes are:

Class I., two-seated vehicles, maximum weight, 1,300 kilos; Class II., four-seated vehicles, maximum weight, 1,500 kilos; Class III., six-seated vehicles, with luggage carrier to take 30 kilos per passenger; maximum weight, 1,800 kilos; the weights being taken when in running order.

All classes may have closed or open bodies, or bodies which may be closed or opened at will; all bodies must be upholstered.

All cars must have at least one double-acting brake and also a sprag. The entry fee prior to March 15 will be twenty francs; part-entries to May 1, 40 francs.

No maker may enter two vehicles of similar type and dimensions.

The points of the competition will be the cost per day, the comfort, ease of control and freedom from noise, and the price.

NEW DECAUVILLE QUARTERS.

Standard Company Secures Central Automobile Company's Broadway Garage.

As a result of the recent disastrous fire in its garage, on Thirty-ninth street, New York, the Standard Automobile Co., agents for the Decauville cars, is following the trend of the trade and moving up town.

FRONT OF STANDARD GARAGE IN NEW YORK AFTER FIRE LAST WEEK.

The place selected is the Central Automobile Company's large garage, at 1684 Broadway, between Fifty-second and Fifty-third streets. The repair shop and storage business of that concern have been taken over by the Standard company, but for the present the Central company will continue to keep its cars there, pending other arrangements which are not yet completed. The prompt action of the Standard company has been the subject of considerable favorable comment.

A PICTURESQUE PROPOSAL.

Asks Permission to Drive 175-H.P. Racer to New York on Rails.

Special Correspondence.

PHILADELPHIA, Dec. 12.—This city is to be represented in the Ormond-Daytona races next month by Edward M. Steck, a wealthy member of the Automobile Club of Philadelphia. His car, a Darracq, which, it is claimed will develop upward of 175 horsepower and attain a speed in excess of 100 miles an hour, is the subject of conversation in the haunts of Quaker automobilists; not so much on account of what its owner hopes it will do on Florida's sunny strand, as for the spectacular request preferred by Mr. Steck to the Pennsylvania Railroad management, to allow a time trial over its tracks between Jersey City and Philadelphia.

Given the right of way, Mr. Steck thinks his flyer can cover the distance between the two cities in less than fifty minutes. This means more than 100 miles an hour.

BOSTON AUTO CLUB'S HOUSE WARMING.

Enlarged Clubhouse Formally Opened with Dinner, Addresses and Music—Extension of Building Erected Three Years Ago Affords Storage for 200 Cars of Members.

Special Correspondence.

BOSTON, Dec. 12.—It was a jolly company, and one in which informality and good-fellowship ruled that gathered in the club rooms of the Massachusetts Automobile Club last Friday evening to "warm" the enlarged clubhouse. The addition to the Boylston street clubhouse, the first one built and occupied by an automobile club in this country, was completed last summer, but as it was then inconvenient for a large number of the members to attend any meeting the house warming was put off until this week. The committee in charge, consisting of Dr. Joseph Stedman, Stephen Sleeper and Harlan W. Whipple, had prepared an interesting program, which began with dinner at 6:30 o'clock and ended at midnight. Through all that time things were kept going in a lively manner, so that the whole building is now properly dedicated to the cause of automobilism.

About one hundred members of the club and a few guests were seated at the dinner which was held in the parlors of the club. President Elliot C. Lee presided at the head table and near him were President Whipple, of the American Athletic Association; President Asa Goddard, of the Worcester Automobile Club, and Police Inspector Smith, of New York. The speechmaking after dinner was brief and informal. President Lee told of the organization of the club, its amalgamation with the New England Automobile Club, and the erection of the original clubhouse on Boylston street. At that time it was predicted by even enthusiastic automobilists that the club had taken too big a burden on its shoulders in attempting to maintain a clubhouse in the best section of the city. That was three years ago. A year's occupancy of the clubhouse showed that the men who had secured the new house had not even looked far enough into the future and that additional facilities for the storage of cars were needed. The addition was begun about a year ago and the club now has room for the storage of 200 cars. President Lee complimented the members of the club on their spirit which had made possible the finest automobile clubhouse in the country.

Harlan W. Whipple spoke of the good example set by the Massachusetts club, which is now being followed by the Automobile Club of America that has just decided to erect a clubhouse and garage. After the speechmaking, there was a musical program by a glee, mandolin and banjo club and by a quartet, and those present joined in the choruses of the popular songs.

In the course of the evening the members and guests took the opportunity to inspect the different parts of the clubhouse and to examine the many fine machines that are owned by the members. The new building has a frontage on Boylston street of 113 feet and a depth of nearly 100 feet with entrances both from Bolyston street and from a street in the rear. The ground floor contains the office of the superintendent and a ladies' waiting-room, and provides storage room for a large number of vehicles that are in constant use by their owners. In the basement there is more storage space and facilities for recharging the batteries of electric vehicles. There is an entrance to the basement from the rear, and it is also connected with the other floors by two automobile elevators. From the street floor there are two wide entrances which make it possible to handle cars of longest wheelbase with ease.

The second floor of the older part of the house is given up to quarters for social purposes, reading-rooms, parlor and dining-room. The new part of this floor is devoted to the storage of cars that are used occasionally, and for which there is no room on the ground floor. On this floor there is also a room for chauffeurs. On the third floor there is the repair shop and more storage room, the cars on this floor being mainly those belonging to members of the club who are out of the city, or who, for some reason, are not using them. While the new garage affords adequate accommodations, the growth of the club and the increase in the number of automobiles owned by its members indicates that it will be only a question of time, when still another increase in space will be needed.

BRITISH MOTOR BOAT CLUB.

Special Correspondence.

LONDON, Dec. 3.—A movement for a club of auto boatmen has been under way for some time at the instance of the paper *Motoring Illustrated*, and a meeting for organization was held on November 23, at the Temple Hotel, London. Mr. Noel Kenealy was made temporary chairman and an organization was effected under the name of the British Motor Boat Club. The following committee was appointed to formulate rules: Noel B. Kenealy, S. F. Edge, Charles Jarrott, S. D. Begbie, Harrington Moore, Mowdsley Brooke, F. C. Blake, Linton Hope, H. Harden, D. Dundas, Frederick Coleman, H. H. Henike, W. Stewart, F. R. Simms, Ernest Owers, Capt. Withey and Edmond Kenealy.

Baron De Zuylen, president of the Automobile Club of France; M. Max Richard, president of the Chambre Syndicale de l'Automobile, and the Duke of Ratibor, president of the German Automobile Club, have been elected honorary members of the Automobile Club of Great Britain and Ire the same day.

MOTOR CLUB ELECTION.

C. H. Hyde Chosen President of New York Club—Membership Now 110.

The New York Motor Club, recently organized, has secured permanent quarters in Bretton Hall, Broadway and 86th Street, where a suite of rooms have been attractively fitted up. The first annual election was held on Thursday evening, December 8, at which time there were two tickets in the field, one headed by S. A. Miles, general manager of the N. A. A. M., and the other by Charles H. Hyde, a prominent Brooklyn attorney. Before the balloting commenced more than forty new members were admitted. A compromise was effected between the supporters of the opposing tickets, which resulted in the election of the following officers:

Chas. H. Hyde, president; S. A. Miles, first vice-president; W. J. P. Moore, second vice-president; A. L. McMurtry, treasurer, and Louis R. Smith, secretary. K. C. Pardee, Frank J. Griffin, Joseph Cowan and Angus Sinclair were elected as board of directors

On Monday evening last a special meeting of the board of directors was held, at which time Mr. McMurtry resigned from the office of treasurer, stating that the pressure of business on his time was too great to permit him to serve in that capacity. Frank J. Griffin, one of the directors, was then elected in his stead, and Mr. McMurtry was elected to succeed him on the board of directors.

The following heads of committees were appointed, who will in turn appoint other members to fill their respective committees: Tours and runs, S. A. Miles; technical, W. J. P. Moore; library, Frank J. Griffin; entertainment, C. C. Boynton; membership, W. J .P. Moore; law, Stephen C. Baldwin; executive, the president and first and second vice-presidents, A. L. McMurtry and Joseph Cowan.

It was decided to hold a smoker on January 15, Sunday evening following the opening of the Madison Square Garden Show, for which invitations will be issued.

The club roster now numbers 110 members, and the organization is in a flourishing condition.

MASSACHUSETTS A. C. CLUBHOUSE, BOYLSTON STREET, BOSTON. SHOWING NEW EXTENSION.

SALON EXHIBITORS.

Foreign Cars and Accessories to Be Shown at Herald Square January 11-24.

Elaborate preparations are being made for the decoration of Herald Square Exhibition Hall for the Importers' Automobile Salon, which opens there on January 11 and continues to January 24. The decorations will be of uniform character, as will also be the illuminated signs. Raised platforms, carpeted and railed, will be provided for the cars, with broad aisles between. An octagonal band stand will be placed in the center of the hall. Women visitors to the show will be served with tea by Japanese tea-girls.

Following is a list of the exhibits and exhibitors:

Argyll cars, Peter Fisher, New York; C. G. V. cars, Charron, Girardot & Voigt, Paris; Clement-Bayard cars, S. B. Bowman, New York; Darracq cars, American Darracq Co., New York; Decauville cars, Standard Automobile Co., New York; De Dietrich cars, Union Motor Supply Co., New York; Delahaye cars, L. J. Gougler, New York; F.I.A.T. cars, Hollander & Tangeman, New York; Hotchkiss cars, Henry Fournier, Paris; Martini cars, Palmer & Christy, New York; Mercedes, Renault and Panhard cars, Smith & Mabley, New York; Mors cars, E. Lillie; Napier cars, Central Automobile Co., New York; Pipe cars, Joseph S. Heller, New York; Peugeot cars, Peugeot Co., Paris; Richard-Brasier cars, E. B. Gallagher, New York; Rochet-Schneider cars, Auto Import Co., New York; Westinghouse cars, Westinghouse Co., Paris; bodies will be exhibited by Rothschild, Vedrine et Cie. and Kellner, Paris, and J. M. Quinby & Co., New York; ignition apparatus, Leon Rubay, New York; acetylene generators, J. B. Colt, New York; Aster motors, A. J. Myers, New York; Peugeot motorcycles, Julius Piel, New York; automobile parts, Malicet & Blin, Paris. There will also be exhibits of Continental, Michelin, Sampson and Peters tires.

ALDEN SAMPSON TO BUY CREST.

An arrangement has been made between Alden Sampson, 2d, of Pittsfield, Mass., and Henry E. Lamb, of the Crest Mfg. Co., Cambridge, Mass., whereby Mr. Sampson is to purchase the entire capital stock of the Crest Mfg. Co., and also the material for production now on hand, in order to continue the output of Crest cars. The transfer of the capital stock carries with it the Crest license privilege of the Association of Licensed Automobile Manufacturers, of which the Crest Mfg. Co. is a member. Mr. Sampson, who formerly built the Moyea, has been experimenting as a builder for a year or more, and last spring entered a car for the international cup race, but it was not finished in time. With the Crest license franchise in hand it is to be expected that a new line will be added at once to the Crest models.

DUQUESNE COMPANY REORGANIZED.

The Duquesne Motor Car. Co., of Jamestown, N. Y., formerly of Buffalo, has been reorganized, a majority of the stock having been purchased by business men of New York City and Jamestown, N. Y., and Erie and Corry, Pa. Work will be commenced at once on 100 cars for the spring trade. Distribution of the Duquesne cars will be in the hands of the American Duquesne Co., which will purchase the entire output. Pending certain necessary changes in the charter of the original concern, the manufacturing business will be conducted by an auxiliary organization, called the Duquesne Construction Co., which will take up the construction of high-speed motor boats when the charter amendments have been made and the original company is in shape for business. LeRoy Pelletier, the founder of the parent company, retains the office of president. The Duquesne machine is a touring car of 16-21-horsepower, with four-cylinder vertical air-cooled motor. The marine motors will, of course, be water cooled

WISCONSIN MALICIOUSNESS.

Milwaukee Club Men Wrought up Over Practices of Farmers.

Special Correspondence.

MILWAUKEE, Dec. 12.—Automobilists in this city and vicinity are up in arms against the practices of farmers to hamper the operation of machines in the rural districts, and the Milwaukee Automobile Club has signified its intention to prosecute to the full extent of the law any person who maliciously attempts to injure an automobile. For some time past numerous complaints have been made that farmers in this locality have been resorting to many devices to cause annoyance to drivers of machines.

One farmer is reported to have said that he derives great pleasure in shooting from some secluded spot at the tires of passing autos. F. C. Beach was the victim of this man, or some one similarly disposed, a short time ago while driving on a road about thirteen miles north of Milwaukee. Mr. Beach says that he was fired at from the rear, two of the shots puncturing one of his tires.

Others have complained that glass has been strewn about on the country highways; that rails and logs have been used as obstructions, and barbed wire has been laid across the road to puncture tires.

Besides these extremely annoying and destructive practices, it is claimed that farmers have pointed guns at motorists, compelling them to stop while the farmers drove mockingly by.

"We have heard a considerable number of complaints relative to the action of farmers in interfering with the operation of automobiles," said Reverend Szukalski, president of the Automobile Club,, "and, in fact, several of them were made at the last meeting of the club. I personally know of one instance when the Kilbourn road was blocked with logs in such a way as to enable wagons to pass without being damaged, but autos would meet with great injury. A gentleman in relating an experience he had in Racine County, recently informed me that the road was covered with glass and that when he attempted to go around it a crowd of bystanders threw missiles at him. The club will not attempt to avenge past outrages, but in the future any interference will be dealt with according to law."

RECENT INCOPORATIONS.

Duquesne Construction Co., Jamestown, N. Y.; to manufacture automobiles. Incorporators, William J. Maddox, Brewer D. Phillips, of Jamestown, and Frank L. Bliss, of Corry, Pa.

Dover Garage Co., Dover, N. J.; capital, $10,000; to manufacture, deal in and repair motor vehicles. Incorporators, Robert A. Bennett, Charles E. Clark and Hiram P. Hall.

Capen Motor Car Co., St. Louis, Mo.; capital, $15,000. Incorporators, Samuel D. Capen, George A. Capen and Wallace G. Capen.

NEW YORK NEWS NOTES.

A committee of five, appointed by the heads of the mechanical departments of the automobile building concerns composing the Association of Licensed Automobile Manufacturers, to consider the organization of a permanent body, to be known as the superintendents' and Engineers' Branch of the A.L.A.M., held a meeting in New York city December 9, and discussed the matter at some length. The object of the organization is the exchange of ideas and experiences, with a view to the general improvement of automobile construction. A general meeting of the members of the A.L.A.M. will be held in this city January 19, when the work of organization will be completed. The first step toward the formation of this society was taken at an informal outing of the superintendents and engineers on October 7 last, and reported in these pages. The delegates at last week's meeting were A. L. Riker, George W. Wesley, Karl Almquist and J. Frank Duryea.

* * *

Fire Commissioner Hayes, of New York, has begun an investigation into the manner in which the garages of the city are conducted with reference to safety from fire. As one result, the license of the Michelin Tire Company to store gasoline in its garage at 132-140 West Twenty-seventh street was revoked on account of the alleged danger to a large number of persons employed in a factory on the upper floors of the building.

* * *

Henry Sanderson, who has been president of the New York Transportation Company since 1900, has resigned that position to enter a banking and brokerage business. The office vacated by Mr. Sanderson has been filled by R. W. Meade. Upon the retirement of Mr. Sanderson the executive staff and employees of the company presented him with a Tiffany desk set in bronze, a presentation speech being made by Herbert H. Vreeland, president of the Metropolitan Street Railway Co., who is a warm personal friend of Mr. Sanderson.

* * *

Two entrances to Central Park, one at West Sixty-sixth street and the other at Fifty-ninth street and Seventh avenue, have been closed to vehicles by the Park Commissioners. These entrances have been in use for three years, and both automobilists and horse drivers express dissatisfaction at their closure. The secretary of the park board makes the statement that the gates were opened to vehicles temporarily, and that the recent order has simply restored the original conditions.

* * *

The new Packard quarters on Longacre square were opened for business on Monday, December 12, and there is already "something doing" in a business way. The establishment will be used only for a salesroom, and, in the rear, a repair shop, there being no garage facilities. The salesroom is large and light, the entire front being of plate glass, and there is plenty of room for showing cars to advantage.

* * *

New York City garage proprietors who are members of the New York Automobile Trade Association have agreed on a maximum rate of $25 a month for the storage, washing and polishing of large automobiles. The charges for small vehicles may be placed at any figure desired.

* * *

The Automobile Club of France has named W. K. Vanderbilt, Jr., as its representative on the Glidden Trophy Commission.

An automobile touring story of more than usual merit opens the December number of *Field and Stream*. The writer, William Arthur Babson, accompanied James B. Dill on his ride of 250 miles from Quebec to the Rangeley Lake region of Maine last summer, passing through what is still a wilderness, the old route of Arnold's expedition against Quebec. Mr. Babson has a keen appreciation of the natural charms of the region, with its quaint, old-time French-Canadian farmers, and also of the strong contrasts brought out by the new means of travel, and with pen and camera together he has made a most fascinating story.

The appearance of the Sunday editions of Philadelphia's most prominent dailies would seem to indicate that their editors have at last concluded that the reading public is interested in automobile news. In its December 4 issue, the *Press*, in addition to its usual budget of motoring news, began the publication of descriptions of routes, with maps. The *Ledger* followed a week later with similar articles, and others have established automobile departments which show a steady increase in amount of space devoted to this class of news.

The Purdue University, of Lafayette, Ind., is now completing plans for the installation of an automobile testing plant. It is intended to conduct this department somewhat along the lines of its locomotive testing plant, which has been in successful operation for more than ten years. The study of automobile construction is one of growing interest among the students of this university, many of whom are entering the automobile business.

Entry blanks for the Cleveland automobile show to be held at the Grays Armory during the week of February 20, have been sent out, and many applications for space returned, although no diagrams have been issued. In past years the tire manufacturers have had an iron-clad agreement not to exhibit at any shows except those in New York and Chicago, but this year they have informed the Cleveland show managers that they will take part in the local show there.

At a meeting of the city council of Wilmington, Del., held on December 8, an automobile speed ordinance was introduced and referred to the law committee. The provisions call for the licensing of all drivers, the carrying of lights, horns and numbers, and the limitation of speed to ten miles an hour, this to be reduced to six miles at street crossings and corners. The ordinance is subject to revision and amendment before final passage.

The Automobile Club of Great Britain and Ireland has given official recognition to the automobile show promoted by the Society of Motor Manufacturers and Traders at Olympia, London, in February, next, and will approach either the King or the Prince of Wales with a view to securing royal aid in the opening of the exhibition.

The National Motor Vehicle Co., of Indianapolis, Ind., has for some years experienced more or less difficulty as a result of the organization of new companies throughout the country that have adopted the word National as a part of their names. The adoption of the name National Automobile Company by a recent New Jersey corporation, is likely to be confusing, and the National Motor Vehicle Company wishes to emphasize the fact that it is in no wise connected with the New Jersey company, but is located in Indianapolis, and is continuing the manufacture of its line of National gasoline touring cars and electric vehicles.

C. A. Coey & Co., whose garage and salesrooms are now located at 5313 Cottage Grove avenue, Chicago, will soon begin the erection of a building on Michigan avenue, between Fourteenth and Fifteenth streets, which they will occupy as a garage and salesroom, in addition to their Cottage Grove avenue establishment. While the company will make the automobile livery business the chief feature for 1905, it will continue to handle the Thomas Flyer.

The James Brown Machine Co., of Pawtucket, R. I., manufacturers of the Cameron cars, are bringing out for the season of 1905 a 50-horsepower six-cylinder racing machine, and also an eight-cylinder 90-horsepower car, which will be completed about July next. The company is now entering the racing business, and will no doubt compete in all the important events during the coming season.

Develin & Co., incorporated at Chicago by A. A. Develin, with a capital of $25,000, will open an automobile establishment at 1407 Michigan avenue. The company has secured the agency as western distributors of the Acme car, embracing Illinois, Wisconsin, Iowa, Missouri, Minnesota and Utah. J. C. Zimmerman, formerly with the Ford Chicago agency will be connected with the new company.

"Mayor Bill" Smith, of Newmarket, N. J., who came in for considerable money through the death, in an automobile accident, of Mr. and Mrs. Charles L. Fair, finds that the business of the Auto Storage Company, Plainfield, N. J., of which he is president, is in such condition that the Court of Chancery at Trenton has been asked to appoint a receiver for it. Mrs. Fair was "Mayor" Smith's sister.

The Williams Messenger Delivery Company, of Louisville, Ky., has bought an Oldsmobile delivery wagon for use in its delivery service. This is the first wagon of the kind to be put in use in Louisville, and if the experiment proves successful the company will purchase several more of a similar type.

Commencing Monday, November 21, *Le Velo*, the old-established Paris sporting journal, appears under the title of *Journal de l'Automobile du Cyclisme et de tous les Sports*. Though having changed its name, the publication, as heretofore, remains under the personal control of M. G. de Pawlowski.

Commissioner West, of the Board of Commissioners of the District of Columbia, has issued an order that all professional chauffeurs applying for license to operate in Washington must obtain certificates of good character from three reputable citizens.

The affairs of the Toronto Automobile Co., of Toronto, Canada, are now being wound up. A statement of condition presented at a recent meeting showed a nominal deficit of $998.65. The assets were estimated at $5,272.40, and liabilities at $6,271.05. The company was originally organized with an authorized capital of $40,000.

Although news of the Glidden trophy offered for touring car competition only recently reached England, great interest is being evinced in automobile circles and one English entry has already been forwarded, Roger Fuller, a member of the A. C. G. B. I., having entered his 30-horsepower six-cylinder Napier car.

H. Paulson & Co., 285 State street, Chicago, has been incorporated for $10,000. They will continue to conduct a garage at the State street address, but will remove the salesrooms to Michigan avenue, the exact location not yet being determined. The company will handle the Pierce cars for 1905.

W. P. Kearney, of Toronto, has recently returned from an extended trip through Europe. While in Paris arrangements were commpleted whereby he will, in conjunction with Mr. Hyslop, also of Toronto, control the sale of the Darracq cars for the Dominion of Canada.

The Bennett-Bird Co., recently incorporated at Chicago, with a capital of $10,000, is now occupying quarters at 1404-1406 Michigan avenue, and will handle the Premier air-cooler car as its leader. The car was formerly handled by Arthur G. Bennett, who is a member of the new company.

The annual meeting and election of five members of the executive committee of the National Association of Automobile Manufacturers will be held at the Victoria Hotel, Broadway and 27th street, New York City, at 10 A.M., Wednesday, January 18.

The Hotel Piedmont, of Atlanta, Ga., has inaugurated an automobile sight-seeing service, and daily tours are now being conducted throughout the city and its immediate vicinity. The vehicles used have a seating capacity of thirty-five passengers.

The Post Manufacturing Co., with quarters at 1908 Broadway, New York, has succeeded T. W. Post in the manufacture and sale of the Post auto tire grip. Mr. Post formerly manufactured this device at 600 Degraw street, Brooklyn.

By an unfortunate mistake, the address of Carl E. Lipman, manufacturer of a large line of rotary pumps, was given in our advertising pages last week as Beloit, Mich. It should have been Beloit, Wisconsin.

The Autovehicle Company, of Newark, N. J., has secured the agency for the Thomas cars for 1905. In addition, the company will continue to handle the Oldsmobile runabouts and tonneaus.

The Reichert Automobile Co., of New Haven, Conn., has secured, through C. S. Henshaw, New England representative for the Thomas cars, the agency for these cars for 1905.

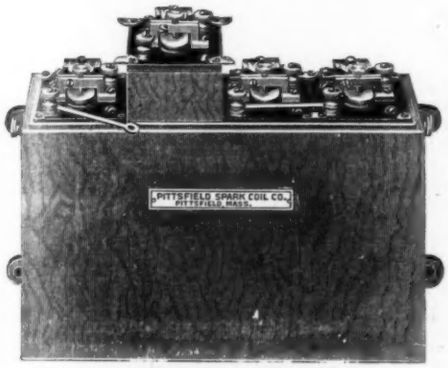
In connection with its other business, the Spokane Machinery & Supply Co., of Spokane, Wash., is now conducting a general repair and storage station for automobiles.

The Welch Motor Car Co., of Detroit, Mich., has filed notice of an increase of its capital stock from $50,000 to $100,000.

The Snell Motor Car Truck Co., of Toledo, O., has changed its name to that of the American Motor Car Truck Co.

INFORMATION FOR BUYERS.

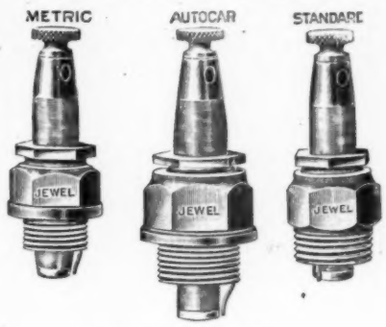
IGNITION APPARATUS. — The Pittsfield Spark Coil Co., of Pittsfield, Mass., believes it has solved the ignition problem, and makes the statement that the Pittsfield spark coil and the Jewel mica plug will go a long way toward getting rid of the ignition bugbear. Pittsfield coils are made single, double, triple and quadruple, with specially designed vibrators said to be particularly rapid in action. The Jewel spark plug is made with a center electrode of cold-rolled steel, insulated with mica highly compressed and retained in position by a head on one end of the electrode and a nut screwed down hard on the mica on the other end. A steel pin is run through nut and rod to prevent loosening. Then the nut, insulation and head are turned down to one uniform size and polished. The shell



PITTSFIELD SPARK COIL.

is also polished, which is said to prevent to a considerable degree the adherence of carbon. Besides these two articles, the Pittsfield Coil Co. manufactures an ignition dynamo with a magnetic governor.

BARRETT JACKS.—The Duff Mfg. Co., of Allegheny, Pa., manufacturers of the Barrett jacks, states that its product was awarded a gold medal at the St. Louis Fair.



JEWEL SPARK PLUGS.

The Barrett jacks have held a high position for years in railroad and other work, and it is not surprising that the manufacturers should produce a first-class article for the use of automobilists.

BRAZING ALUMINIUM.—The A-Z Co., 462 Eleventh avenue, New York City, announces that it is prepared to braze aluminium, an operation that has been tried often but, as a rule, with indifferent results.

AUTO WASH BASIN.—Automobilists who like to keep their hands clean, as most of them do, have doubtless frequently wished for some convenient arrangement for "washing up" on the road without drawing upon the supply of cooling water. The Rubber Appliance Co., Springfield, Mass., has placed on the market a device that seems to be what is wanted. It is a combined wash basin and tank, all made of rubber. The tank holds sufficient water for a dozen washes; the basin is filled by pressing a valve which admits water. The tank is water-tight and will not leak. Either hot or cold water may be used. When filled with hot water the device makes a first-class foot warmer. Pockets are provided for soap and towels, so that the whole of the paraphernalia is kept together. When empty, the apparatus folds together like an opera hat, and can be stowed in a small space.

DASHBOARD ODOMETER. — The Veeder Form D odometer, made by the Veeder Mfg. Co., of Hartford, Conn., is intended to fasten on the dashboard of the automobile and is driven by a flexible shaft from gearing on the front wheel hub. There are two dials or registers on the instrument, set one above the other. One is a trip register, and may be set back to zero at any time. It is used for indicating the mileage of short runs without the necessity of figuring out the distance from successive readings of the other register, which continues

VEEDER DASH ODOMETER WITH TRIP DIAL.

to indicate the total distance run until its capacity has been reached, when it automatically returns to zero. Distances are indicated in miles and tenths. The flexible shaft is revolved at a slow rate of speed by the use of suitable reductions in the gearing. Slow speed means long life to the wearing parts.

AUTOMOBILE PARTS.—The J. H. Neustadt Co., 826-830 South Eighteenth St., St. Louis, Mo., has issued an exceedingly comprehensive catalogue for 1905, in which may be found listed every part required to build automobiles of almost every variety, from a light buckboard to a heavy commercial machine or a high-powered touring car. Any part may be purchased separately, or running gears may be had in any stage of assembly. Parts for building runabouts of popular forms are supplied in complete sets, including motors and all accessories. Bodies in great variety are made, being sold "in the white," no painting being done by this concern. Seats may be had upholstered or not, as desired. Motors of many types are listed, single cylinder, horizontal and vertical, double cylinder opposed, vertical motors with one, two, three, four, six or eight cylinders, air-cooled motors and water-

RUBBER APPLIANCE COMPANY'S COLLAPSIBLE WASH BUCKET IN USE.

cooled motors. In fact, it is difficult to think of anything pertaining to the automobile or automobiling that is not well represented in this catalogue.

ANTI-FREEZING SOLUTION.—For the convenience of automobilists who want a good anti-freezing solution for use in the cooling systems of their cars during the winter but do not care to make their own compounds, the Solvay Process Co., of Syracuse, N. Y., puts up a highly concentrated solution of calcium chloride in 2-gallon cans. The "Solvay" calcium chloride is proclaimed to be chemically pure and free from sediment and a solution of it to remain liquid at temperatures down to 30 degrees below zero, according to its strength. This chloride is also put up in the form of crystals in 10-pound cans. The Carbondale Chemical Co., Carbondale, Pa., has the general sales agency for these goods.

TO PREVENT SKIDDING.—"Better than insurance" is the statement made by C. J. Bailey & Co., No. 22 Boylston street, Boston, Mass., concerning the Bailey "Won't Slip" tire. The tread of this tire has projecting studs of rubber, which prevent or reduce slipping, reduce the "drag" resulting from suction, and render the tire less liable to puncture than a tire with a plain tread. The manufacturers state that three well-known American tire manufacturers have taken licenses under the Bailey patent, and that a number of automobile manufacturers have ordered Bailey tires for their entire output of 1905 cars. A little booklet gives the "reasons why" and also some letters from users who think the Bailey tire a good thing.

AUTOMOBILE SEATS.—The King Spring Co., of Buffalo, N. Y., is manufacturing a line of stick seats for automobiles, in addition to building automobile bodies from specifications furnished by customers. This concern also is the sole manufacturer of the King spring.

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SPECIAL NOTICES

Advertisements inserted under this heading at 20 cents per line: about 7 words make a line. Remittance should accompany copy. Replies forwarded if postage is furnished.

AT reasonable price, Waverley Electric; 30 cells; new last spring; A1 condition. Waverley, 12 W. Read st., Baltimore, Md. 31

A SOLUTION to prevent acetylene generators freezing; will nearly double the time a lamp will run with one charging; also preventing the saturated carbide freezing. H. J. Willard, Congress Sq. Auto Station, Portland, Me. jan7

AUTOMOBILE manufacturers considering a New York agency are invited to communicate with the advertiser, who has the experience and ability to handle a line suitable to the market. Address Sales, care The Automobile. 10-17

A MORE uniform mixture can be obtained by the use of our automatic air governor, when applied to the Oldsmobile mixer; this means more power and speed; easily attached; not necessary to remove mixer; sent upon receipt of price, $2.50; circular upon application. More-Power Co., Box 175, Lowell, Mass. jan7

BARGAIN, $170—Must sell at once, brand new Locomobile, with condenser; 100 miles on one filling of tanks; automatic water regulation for boiler; steam pumps, puncture proof tires, Kelley generator, top and other improvements. Address E. T. W., care Automobile. 17